Volume 12
Number 143 *Hogging-down corn---A successful practice*
Article 1

August 2017

Hogging-down corn---A successful practice

John M. Evvard
Iowa State College

W. J. Kennedy
Iowa State College

H. H. Kildee
Iowa State College

Bulletin No. 143 September, 1913

HOGGING-DOWN CORN---A SUCCESSFUL PRACTICE

AGRICULTURAL EXPERIMENT STATION
IOWA STATE COLLEGE OF AGRICULTURE
AND THE MECHANIC ARTS

Animal Husbandry Section

Ames, Iowa

OFFICERS AND STAFF

IOWA AGRICULTURAL EXPERIMENT STATION

STATE BOARD OF EDUCATION.

Hon. J. H. Trewin, Cedar Rapids.
Hon. A. B. Funk, Spirit Lake.
Hon. George T. Baker, Davenport.
Hon. Charles R. Brenton, Dallas Center.
Hon. E. P. Schoentgen, Council Bluffs.
Hon. Parker K. Holbrook, Onawa.
Hon. D. D. Murphy, Elkader.
Hon. Roger Leavitt, Cedar Falls.
Hon. Henry M. Eicher, Washington.

OFFICERS.

Hon. J. H. Trewin, Cedar Rapids.....President
Hon. D. A. Emery, Ottumwa.....Secretary

FINANCE COMMITTEE.

Hon. W. R. Boyd, President, Cedar Rapids.
Hon. Thos. Lambert, Sabula.
Hon. D. A. Emery, Secretary, Ottumwa.

AGRICULTURAL EXPERIMENT STATION STAFF.

Raymond A. Pearson, M. S. A., LL. D., President.
C. F. Curtiss, M. S. A., D. S., Director.
W. H. Stevenson, A. B., B. S. A., Vice Director.
J. B. Davidson, B. S., M. E., Chief in Agricultural Engineering.
Arthur W. Griffin, Assistant Chief in Agricultural Engineering.
W. H. Stevenson, A. B., B. S. A., Chief in Agronomy.
L. C. Burnett, M. S. A., Assistant Chief in Cereal Breeding.
H. D. Hughes, B. S., M. S. A., Chief in Farm Crops.
P. E. Brown, B. S., A. M., Ph. D., Assistant Chief in Soil Bacteriology.
John Buchanan, B. S. A., Superintendent of Co-operative Experiments.
R. S. Potter, A. B., M. S., Ph. D., Assistant in Soil Chemistry.
L. W. Forman, B. S., M. S., Assistant in Soils.
Charles R. Forest, Field Superintendent.
E. H. Kellogg, B. S., Assistant in Soil Chemistry.
Robt. Snyder, B. S., Assistant in Soil Chemistry.
W. H. Pew, B. S. A., Chief in Animal Husbandry.
John M. Evvard, M. S., Assistant Chief in Animal Husbandry.
H. H. Kildee, B. S. A., Assistant Chief in Dairy Husbandry.
Geo. M. Turpin, B. S., Assistant Chief in Poultry Husbandry.
Russell Dunn, Assistant in Animal Husbandry.
D. B. Adams, Herdsman.
R. E. Buchanan, M. S., Ph. D., Chief in Bacteriology; Associate in Dairy and Soil Bacteriology.
L. H. Pammel, B. Agr., M. S., Ph. D., Chief in Botany.
Charlotte M. King, Assistant Chief in Botany.
Harriette Kellogg, A. M., Assistant in Botany.
A. W. Dox, B. S., A. M., Ph. D., Chief in Chemistry.
R. E. Neidig, M. S., Assistant in Chemistry.
W. G. Gaessler, B. S., Assistant in Chemistry.
S. C. Guernsey, B. S. A., M. S., Assistant in Chemistry.
W. Eugene Ruth, M. S., Assistant in Chemistry.
J. W. Bowen, A. M., Assistant in Chemistry.
M. Mortensen, B. S. A., Chief in Dairying.
B. W. Hammer, B. S. A., Assistant Chief in Dairy Bacteriology.
H. E. Summers, B. S., Chief in Entomology.
R. L. Webster, A. B., Assistant Chief in Entomology.
S. A. Beach, B. S. A., M. S. A., Chief in Horticulture and Forestry.
Laurenz Greene, B. S. A., M. S. A., Assistant Chief in Pomology.
A. T. Erwin, M. S., Assistant Chief in Truck Crops.
G. B. MacDonald, B. S. F., Assistant Chief in Forestry.
J. H. Allison, Assistant in Plant Introduction.
T. J. Maney, Assistant in Horticulture.
C. H. Stange, D. V. M., Chief in Veterinary Medicine.
F. W. Beckman, Ph. B., Bulletin Editor.
F. E. Colburn, Photographer.

CONTENTS.

SUMMARY

I. FIELD CORN IS "HOGGED-DOWN" SUCCESSFULLY AND ECONOMICALLY in practically all sections of Iowa. Almost 200 farmers, having an average experience of over 6 years, report the method efficient from 98 of Iowa's 99 counties.

II. EXPERIMENTAL PRACTICAL FEEDING TRIALS SHOW UNMISTAKABLY THAT THE HOG IS A SUPERIOR CORN HARVESTER when properly allowed to harvest the crop. Pork is produced more rapidly and more cheaply than when corn is full fed by hand. No corn is wasted if rightly managed.

III. TO "HOG" STANDING CORN ALONE WITH YOUNG SHOTES (THE CORNFIELD FAVORITES) WITHOUT PROTEIN PASTURE OR FEED SUPPLEMENTS IS COMPARATIVELY UNPROFITABLE; in 1911 with standing field corn (unsupplemented) the production cost of pork was $3.14 a hundred, seeding soy beans in cornfield reduced cost to $2.87, putting rye in at last cultivation and feeding meat meal still further decreased it to $2.69, and by allowing meat meal only without pasture to $2.43.

IV. IOWA FARMERS DEPEND LARGELY UPON SUPPLEMENTS OF SOME SORT; 87.83% mention pasture of some sort, 64.02% use cornfield crops, 6.88% both field and adjoining pasture, while 16.93% count on regular pastures alongside entirely. Almost half of the men use some form of feed supplement such as meat meal or tankage, skim milk, oil meal, middlings or shorts; home mixtures of oats, rye, barley with some other grains, and oats. The cornfield crops in order of popularity are Rape (Dwarf Essex), Rye, Pumpkins, Red Clover, Cow Peas, Soy Beans and Mammoth Clover.

V. THE USE OF SUPPLEMENTS, PROPERLY SELECTED, WHETHER HOMEGROWN OR PURCHASED, OR A COMBINATION OF THE TWO, WHEN FED TO SHOTES IN CORNFIELD INCREASES RAPIDITY OF GAIN, ADDS TO THE PORK YIELD ON THE ACRE AND FOR A BUSHEL OF STANDING CORN, PROMOTES HEALTH AND RUGGEDNESS, AND DECREASES THE COST OF PORK PRODUCTION. Adjoining pastures of Alfalfa, Rape, Red Clover, and Blue Grass are unexcelled. Rape is pre-eminently the leading supplemental crop, seeded at the last cultivation.

VI. CORNFIELD CROP SUPPLEMENTS such as Soy Beans, Cow Peas, Canadian Field Peas and Hairy Vetch, ranking in order named, are inferior to Rape, Rye, Pumpkins or their combinations for Iowa conditions. Hairy or Winter Vetch is practically worthless as a hog forage; it cannot compete with our standard crops.

VII. A SAVING OF 6.89 CENTS ON EVERY BUSHEL "HOGGED-DOWN" is estimated by 158 farmers. The pork made from a bushel of corn is given at 12.02 pounds; the station figures exceed this somewhat with well supplemented corn and young shotes. Well dented or ripened corn is mostly used for "hogging."

VIII. SMALL FIELDS ARE PREFERRED; over 74% of farmers using under 19 acres; 45.46% turn into less than 9 acre areas.

IX. THE FENCING PROBLEM IS COMPARATIVELY EASILY SOLVED by using 26 inch woven wire stretched to well-set corner posts and tying same to corn stalks. Hurdles are antiquated.

X. SOME ADVANTAGES OF "HOGGING-DOWN" CORN are labor saved, storage charges and losses lessened, returns equally as good as when hand-fed, hogs develop good constitutions for subsequent finishing, manure is conserved and uniformly distributed, weeds may be cleaned up, and others.

HOGGING-DOWN CORN---A SUCCESSFUL PRACTICE

By John M. Evvard, W. J. Kennedy,[a] H. H. Kildee.[b]

"Hogging-down" of corn is a practical and efficient method of gathering the crop and feeding the hogs.

Farmers who have tried it are almost unanimously agreed that the method is economical and successful. The most enthusiastic "hogging-down" men are those who have followed the method longest. The animal husbandry section of the Iowa Agricultural Experiment Station has in practical tests convincingly justified this faith of the practical men.

A surprising number of Iowa, Illinois, Missouri, Nebraska, Indiana, Kansas and other mid-western farmers are "hogging-down" corn because it is a paying proposition. The practice has become popular within recent years because of the comparatively low quality and the general scarcity of labor. When the hog harvests his own meals he makes of himself a very efficient labor saving animal. Moreover, the hog to be most profitable should gain rapidly and cheaply, and these two essential factors of economic pork production emphasize the hogging-down way.

There are, of course, practical men who condemn the practice. One inexperienced man, who lives in town, writes: "I am glad to say that I have never had any experience in 'hogging' corn, and I believe it should not be encouraged." He continues in this vein: "That this is an extravagant way of harvesting corn there can be no question . . . if competent labor could be secured no corn would be hogged-down." Still another makes this interesting contribution: "Hogging-down corn suits the fellow that likes to sit in an easy chair in the fall time." It is significant that of some 76 odd men who had no personal experience in allowing the hog to harvest the corn crop 17.1% give reports unfavorable to the practice, 23.7% favorable, while 59.2% were non-committal.

On the other hand, among 194 experienced men, 92.8% were favorable to hogging-down and only .5% unfavorable. But one of the entire 194 thought the practice was not profitable and yet two out of three replies from the same northeastern county from

---

a Resigned June, 1912. Formerly Chief in Animal Husbandry, now Director of the Extension Department, Iowa State College.

b Resigned September, 1910. Formerly Assistant Animal Husbandryman, now Associate Professor in Charge of Milk Production, Iowa State College.

Note:—Acknowledgement is made to Dr. A. W. Dox, W. G. Gaessler and S. C. Guernsey of the Chemical Section for valuable co-operation in chemical analyses of some of the feeds and forage used. All analyses reported are from the chemical section of the Iowa Agricultural Experiment Station.

which this unfavorable reply came wrote, "yes" under the question, "Is it profitable?" Some 6.7%, or 13, of the 194 limited their affirmative answer in general as follows: "Yes, if rape, rye or cow peas are sown with the corn;" "If corn is thin and rape is sown;" "Yes, unless season is very wet;" "If done with judgment;" "If right 'sized' hogs are used;" "When labor is required or scarce;" "If not too muddy;" "Under certain conditions it is." These limitations placed upon the profit of this method need not be considered an indictment against "hogging-down;" they simply emphasize the exercising of good judgment. It is necessary to study the problem thoroughly and judge what is best for local conditions.

ADVANTAGES OFFSET DISADVANTAGES OF HOGGING-DOWN.

Obviously there are some disadvantages* to "hogging-down" corn such as wet weather, sometimes packed and hardened fields, difficulty of fencing, loss of stover and so on, but the practice nevertheless is quite widely followed all over the state in spite of the drawbacks; the significant distinctive advantages in labor saved, rapid economical gains, fertility increase and others, greatly overshadow the disadvantages. One enthusiastic Iowan who successfully practices the method puts it in this wise: "There is no way of feeding hogs that has not its advantages and disadvantages" . . . "Everyone must solve for himself which predominate." Another from Pottawattamie county says: "The advantages are so great in our section that with due regard to the small disadvantages many are planning to do more of it."

One man from Marion county may be quoted thus: "The man who gathers corn that he intends to feed to fattening hogs any time in the fall is like the fellow who insists on plowing with the old wooden mold-board plow, doing hard work without any compensation." A Hardin county hogman writes: "I was the first one around here to 'hog-down' corn and they laughed at me but those that laughed are now the most enthusiastic, saying it is the only way." This unique expression, "My neighbors all like to work too well to 'hog-down' corn," comes from Eastern Iowa. "I have been 'hogging-down' corn for ten years and if I should farm for fifty years more would keep right on doing the same thing," says a man who has studied the problem for ten years and follows it when conditions are right.

The practical experiments conducted by the animal husbandry section of the Iowa Station demonstrate quite clearly that hogs can gather their own corn to advantage by making efficient use of the grain eaten as they carry on their labor-saving and fattening campaign. The results show also, however, that in the corn-

*Refer to Table XXV and pages 44 to 50.

field, as in the dry lot or on pasture, the same general principles of nutrition govern the hogs' appetite, digestion, assimilation, growth and fattening. In hogging-down it is necessary to figure where the protein is coming from to grow the young hogs. True enough, cornfield weeds such as purslane, lamb's quarter, pig weed, morning glories and others may furnish considerable of the muscle and bone forming materials, yet the commonly used 100 to 150 pound shote is still in need of more building and growing material than is found in corn alone, and if the field is clean, free from weeds, and pasture is not available, some means should be provided whereby the animal is given more muscle and bone building materials than the corn crop can possibly furnish.

OBJECTS AND METHODS OF THE INVESTIGATION.

The principal purposes for carrying on the work recorded in this bulletin were:

I. To learn how the "hogging-down" method works out in practice upon the farms in Iowa.

II. To determine the advisability and practicability of allowing the hogs to harvest the corn crop.

III. To find out whether a supplement is needed in the cornfield and if so, whether it should be purchased or home grown.

IV. To compare cornfield with the dry lot system of feeding.

V. To learn:

(a) The pork production value of an acre of corn; also of a bushel.

(b) The comparative production cost of pork made in the cornfield under different systems of management.

(c) The return of a bushel of corn in the field, hogs selling at $6.00.

VI. To discover the various advantages and disadvantages of the "hogging-down" system.

In the experimental work at Ames in 1909-10-11, the plots were all practically .9 of an acre, located on second bottom land which yielded about 50 bushels an acre. The hogs used were chiefly pure bred or high grade Duroc Jersey spring shotes. Initial and final weights were secured by taking the average of three successive daily weighings at the beginning and end of the tests, respectively. Regular weighings were generally made every ten or thirty days. The hogs were housed in movable houses and allowed water at free will in open troughs. In 1909 and 1910 the corn graded No. 3, in 1911 it was reduced to 16% moisture, making safely No. 2. Meat meal was the protein supplement used. Those that were fed, received feed twice daily, about 7:30 a. m. and 5:00 p. m. Meat meal supplement was fed first as a thin slop. Labor, risk and interest on hogs and interest

and depreciation on equipment were assumed to be offset by the manure produced,* its uniform distribution without extra labor or leaching loss, and the difference between farm value and delivered market price charged for corn consumed. Labor includes feeding, management and marketing of hogs.

HOGGING-DOWN ON IOWA FARMS.

GENERAL EXTENT AND CHARACTER OF PRACTICE.

To gather trustworthy information as to the actual farm value of allowing hogs to harvest the corn crop the animal husbandry section got into close touch with some 300 farmers, 194 of whom had an average experience with the practice of 6 years each. A number of questions were asked and suggestions were encouraged. The summary of their experience is brought out in table I.

TABLE I.—EXPERIENCE OF MEN WHO "HOG-DOWN" CORN

194 Farmers Report from 98 of Iowa's 99 Counties in 1913

Practiced Method How Long? (Years)	Number of Hog Raisers	Per Cent for Each Period of Years
1 to 2	37	19.07
3 to 4	45	23.26
5 to 6	51	26.28
7 to 8	19	9.79
9 to 10	16	8.25
11 to 12	4	2.06
13 to 14	3	1.55
15 to 16	4	2.06
17 to 20	4	2.06
21 to 24	3	1.55
25 to 29	3	1.55
30 to 35	5	2.58
Total	194	100.00

A GRAND AVERAGE OF 6.03 YEARS TO THE FARM, OR EQUIVALENT TO THE EXPERIENCE OF 1,170 MEN FOR ONE YEAR OR ONE MAN FOR 1,170 YEARS.

Corn is successfully hogged down in every section of Iowa. The reports show practical results in 98 of Iowa's 99 counties under all kinds of conditions. A glance at the map, fig. 1, will give a more comprehensive idea of the wide use of the practice. This great range of experience, both geographical and chronological, gives reliability to the opinions presented. Add to the experience of these many practical men the closely figured and favorable results of the Iowa Agricultural Experiment Station, and naturally the conclusions are of double interest and value.

*Dry lot checks given same credit, which of course is not due them.

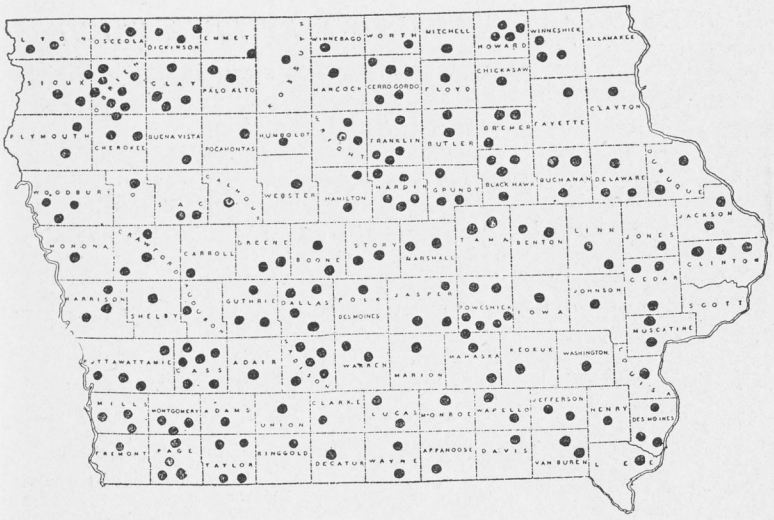

Fig. 1.—Corn is hogged down in practically every corner of Iowa. The black dots show farms on which corn is economically and satisfactorily hogged down.

HOW SUPPLEMENTAL CROPS ARE SECURED.

Among the questions put to practical farmers were these two: "Do you sow other crops with corn to furnish variety?"

"Do you ever feed supplements, such as tankage, meat meal, oil meal or skim milk, to hogs in the cornfield, and do you deem it advisable?"

It is striking that 134 or 70.9% of those who answered sow other crops besides corn in the field which is to be "hogged-down;" 32 or 16.93% depend entirely on other pasture, while 23 or 12.17% mention neither a cornfield nor adjoining pasture crop supplement. The general survey of these practices is more plainly shown in table II.

TABLE II.—HOW SUPPLEMENTARY CROPS TO CORN ARE SECURED

189 Farmers' Experiences

In cornfield:	Number Reporting	Per Cent Following Each Practice
No other pasture mentioned	121*	64.02
Use adjoining pasture also	13	6.88
Depend entirely on other pasture	32	16.93
No field crops or pasture mentioned	23	12.17
Total	189	100.00%

70.9 PER CENT OF THE FARMERS REPLYING USE SUPPLEMENTAL CROPS PLANTED IN THE CORNFIELD; 87.83 PER CENT USE EITHER SUCH CROPS OR SUPPLEMENTAL PASTURE.

*5.79% or 7 of these 121 sow crop (rape) in corn only when stand is thin.

SUPPLEMENTARY CROPS SOWN BY IOWA FARMERS

Reference to the supplementary crops sown in the practical cornfield as given in table III will show plainly the preference of the Iowa farmer for rape, rye and pumpkins.

That Dwarf Essex rape should be used (table III) by 80.6% of the farmers reporting the sowing of supplementary crops in the cornfield is not particularly surprising. Of all the supplementary pastures to corn in the corn belt the animal husbandry section has shown that rape requires the least protein and mineral nutrient supplement of any of the principal forages; alfalfa. red clover, rye, soy beans, cowpeas and others are clearly excelled in this regard.

TABLE III.—SUPPLEMENTARY CROPS WHICH ARE SOWN IN CORN FIELDS.

70.9% or 134* Farmers Report Sowing Them

Crop	Number Sowing	Per Cent of the 134 Farmers Using the Supplemental Crop**
Rape	108	80.60
Rye	20	14.93
Pumpkins	19	14.18
Red Clover	6	4.48
Cow Peas	4	2.98
Soy Beans	2	1.49
Mammoth Clover	1	.75
	160**	

*134 or 70.9% of the 189 experienced men replying; 5 of the original 194 men did not answer the question.

**Some men sowed combinations; the favorites are given in order of popularity—Rape and Pumpkins; Rape and Rye; Rape, Rye and Pumpkins; Rape and Clover; and so on.

That rye should be the next favorite corresponds closely with the Station's experimental "hogging-down" figures.

Pumpkins are given high rank as a cornfield crop.

These replies of farmers to the supplemental crop question are quite interesting and instructive:

"Turning hogs into the bare cornfields is just as harmful as too much corn alone in dry lot; we sow rape at the time of laying the corn by.....alfalfa and rape are the best of all hog pastures."

"We sow rape in barley stubble when adjoining, and sometimes in the cornfield at the last cultivation."

"Pumpkins in the missing hills and rape early in July the last time over the corn.'"

"Hogs for some reason make better gains on rape and standing corn than any ration we can devise."

"Do not sow other crops because hogs have access to green clover, green oats and blue grass."

"Have tried cow peas and soy beans drilled in corn rows but will sow rape at last cultivation this year."

"I can never get much rape in a thick stand of corn but when thin, a good stand."

"Rye is a good addition, it helps the pigs' appetite."

Fig. 2.—Rape in a northern Iowa corn field that yielded over 90 bushels of corn per acre.

"Have clover in oat stubble, sometimes rape, this is enough unless pigs are small."

"Have used rye, wheat and oats but last 12 years use rape at last plowing."

"Soy beans do not do well up here in northern Iowa so we sow rape."

"Sometimes plant pumpkins putting seed in one planter box and corn in the other, thus have two rows of pumpkins and two of corn .....rape also at last cultivation."

"I have seen no cholera in herds where 'hogging-down' is practiced and rape is used—the hogs seem healthier. The rape is worth as much for the stock cattle after the hogs are through as the corn stalks would be worth if husked.....the rape grows two feet high with hogs in it, and the rape stalks keep the land from washing in the spring."

"Do not sow crops in corn, as they detract from yield."

"Alfalfa pasture is enough and I get more corn by not sowing soy beans or cow peas in the cornfields."

SUPPLEMENTARY CONCENTRATED FEEDS ARE WIDELY USED.

Some supplementary concentrated feeds are fed to hogs which are harvesting their own feed in the cornfields of Iowa. Of 186 men giving their experience almost one-half, or exactly 48.39 per cent, report the use of some supplement such as meat meal, tankage, skim milk, oil meal, oats middlings and so on. The summary of the story told is most easily read from table IV.

TABLE IV.—WHEN ARE SUPPLEMENTARY FEEDS FED TO HOGS IN CORNFIELD?

48.39% (Almost One-half) or 90 Report Their Use

Use What?		Number	Per Cent for
Pasture Crops*	Feed Supplements**	Doing so	Each Combination
Yes	No	84	45.16
Yes	Yes	82	44.09
No	No	12	6.45
No	Yes	8	4.30
		186	100.00%

*Includes all pastures, Rape, Clover, Alfalfa, Blue Grass, Rye, Pumpkins, Cow Peas and so on. May be either in corn or adjoining field.
**Includes Skim Milk and Buttermilk, which may be either a home or purchased product.

Of those who depend upon pasture whether in the cornfield or alongside 50.6 per cent, or a little over half, do not feed supplement while 49.4 per cent or almost half do feed supplement. Of those who do not mention pasture, 40 per cent feed supplement and 60 per cent do not. The particularly interesting thing is that relatively the larger per cent of men who use pasture do not feel the need of supplement; however, both the using of pasture and supplement is quite generally practiced. Over 93 out of every 100 (or exactly 93.55 per cent) use both pasture and concentrated supplement or else one or the other, furnishing evidence that the hogs in cornfield need more bone and muscle building material than corn only provides. That 64.28 per cent, or 54 out of the 84 who depend entirely upon adjoining pasture crops to furnish the protein (muscle building) and mineral (bone making) materials for the hogs in the cornfield should use rape in some manner is significant.

The size and fatness of the hogs determine in a large measure the amount of supplement to use. Fairly heavy, well-grown, big-boned, and heavily-muscled hogs of 200 pounds or more will need very little, if any, supplement when turned into the cornfield. Rape, clover, alfalfa and the like will furnish an abundance of protein and mineral nutrients under such conditions. However, with young, rapidly growing shotes weighing in the vicinity of 80 to 150 pounds, some supplement such as skim milk, buttermilk, oil meal, meat meal, tankage or similar supplements will be needed unless rape is used. A great deal depends upon the cleanness of the fields. Where considerable soft, fleshy purslane, young and tender pigweed, and similar weeds abound it is quite likely that the pig will get considerable protein from this source.

THE SUPPLEMENTARY FEEDS MOST COMMONLY USED.

A brief survey of table V shows that 52% of the farmers who use a supplementary feed are using meat meal or tankage, 44% skim milk, 29.33% oil meal, 18.67% middlings or shorts, 16%

home mixtures, and 13.3% oats. A few mention condiments such as salt, wood ashes, air-slacked lime, etc. That the farmer has chosen the most efficient and economical supplements there is little question.

TABLE V.—SUPPLEMENTARY FEEDS THAT ARE USED

Feed	Times Mentioned**	Per Cent of Farmers Using Each Feed	Per Cent of Times Each Feed is Mentioned
Meat Meal or Tankage	39	52.00	29.77
Skim Milk	33	44.00	25.19
Oil Meal	22	29.33	16.79
Middlings or Shorts	14	18.67	10.69
Home Mixture*	12	16.00	19.16
Oats	10	13.33	7.63
Molasses Feed	1	1.33	.76
Total "Mentions"	131***		

*Ground Oats, Rye and Barley usually, or something similar.
**These were mentioned: Salt, 6 times; Air Slacked Lime, 4; Slacked Coal, 2; Condiments, 2, and Wood Ashes, 1.
***Some fed two or more supplements.

In regard to the supplementary concentrated feed problem some quotations from men over the state are especially suggestive:

"Standing corn and tankage are hard to beat in finishing hogs."
"We depend upon rape and plenty of grass on the side mostly, but also feed a little tankage."
"Our hogs have plenty of salt before them at all times."
"We feed supplemental feeds only when the hogs have no clover to go to."
"We do not think it pays to feed supplements while in the cornfield because our hogs have plenty of green rape and rye at their very feet."
"I feed tankage in a self feeder.....the hogs do not overeat."
"I have used meat meal, oil meal and skim milk, they are all good."
"When the pigs are young we feed them oats."
"Oil meal, ground rye and oats makes a good swill to be fed in conjunction with rape, rye and lots of pumpkins."
"We like a mixture of oil meal and tankage."
"Supplements are profitable because they induce heavy corn consumption; we use oil meal, meat meal and oats."
"We feed tankage, salt and wood ashes, more tankage when the green feed is scarce."
"I use salt, charcoal and lime."
"Finish on tankage when clover is gone."
"Whether or not I feed supplement is dependent upon the amount of green feed present."
"Oil meal keeps hogs sleek; salt makes them drink and the more they drink the more they eat and the faster they grow."
"The mixture of tankage and oil meal is better than either alone."

These expressions need no comment especially, because they tell their own story.

METHODS OF FEEDING PURCHASED SUPPLEMENT.

The Iowa Agricultural Experiment Station feeding trials show that tankage, skim milk, buttermilk, oil meal and the like are very efficient protein and mineral supplements to corn; the practical man has also found this out. The Station experience is also that a mixture of oil meal and tankage is superior to either alone when it comes to making rapid gains. The relative amounts of the two feeds to use in the mixture is dependent upon fluctuating feed prices. When oil meal is high-priced and tankage low the more of tankage one can proportionately use, and vice versa.

The feeding of tankage in a self-feeder is mentioned a few times as being a satisfactory way of feeding supplement in the cornfield. Where hogs have plenty of corn within reach it is quite likely that this method of feeding will be satisfactory. A recent experimental test at this station with hogs in dry lot, tankage being fed by hand as compared to a self-feeder, showed up in favor of the self-feeder method. The shelled corn, all the hogs would eat, was allowed twice daily; the average daily gain where the tankage was hand-fed was 1.33 pounds, and with the self-feeder 1.46 pounds. The feed required per hundred pounds gain, where hand-fed, was 520.1 pounds of shelled corn an 26.1 of tankage, or a total of 546.2; in the self-feeder 478.7 pounds of corn and 30.7 of tankage, or a total of 509.4. Counting corn at 50 cents and tankage at $2.50 the costs of a hundred pounds gain were respectively, $5.30 where hand-fed and $5.04 where the self-feeder was used.

It is interesting to note that in the beginning month about 9% as much tankage was eaten as of shelled corn where it was allowed in self-feeder; toward the finish or the last month of the three months' trial slightly less than 3% was consumed thus showing as the hogs become fattened their appetite naturally calls for less of the high protein and mineral supplement. The hand-fed lot received a 5% allowance of tankage, whereas the self-feeder hogs consumed practically 7% as much as of corn. Peculiarly enough these self-feeder hogs shrank less per head in going to market, presumably because they finished practically on corn alone. Other tests at this Station show that the self-feeder has a field of usefulness in swine raising. Inasmuch as difficulty may be experienced in getting hogs in the cornfield to come up and eat supplement regularly the self-feeder may deserve a trial in solving this difficulty.

RESULTS OF STATION TESTS OF SUPPLEMENTS.

GREEN SUPPLEMENTS INCREASE RATE OF GAIN.

Undoubtedly the addition of a home-grown green supplement to the cornfield increases the rapidity of gains. This is especially true when young shotes are used. Trials with pigs in standing corn alone as compared to pigs in fields alongside in which soy beans and cow peas were used show quite clearly that the gains are put on more quickly where there is a green supplement. An examination of table VI brings out these facts.

TABLE VI.—GREEN SUPPLEMENTS IN CORNFIELD INCREASE RAPIDITY OF GAINS

Eight Weeks Test—Sept. 14-Nov. 9, 1909
Eighty Pound Shotes at Start

	Average Daily Gain (Pounds)
Standing Field Corn only	1.171
Standing Field Corn and Soy Beans*	1.573
Standing Field Corn and Cow Peas*	1.216
Standing Sweet Corn and Cow Peas*	1.456
Check Dry Lot, Ear Corn plus 1-10 Meat Meal	1.313

*Drilled in wheel marks at corn planting time.

That soy beans should make more rapid gains than cow peas is not surprising inasmuch as soy beans, especially for central and northern Iowa, are a more adaptable crop.

That sweet corn and cow peas do well in so far as the welfare of the hog is concerned is quite evident. Some farmers use considerable sweet corn early in August for "hogging-down" purposes. The cow peas or any other green crop do somewhat better in sweet corn than in field corn, because there is not such a great conflict for soil moisture and sunlight; sweet corn requires less water than field corn and makes much less shade.

The object of this test was simply to determine rapidity of gains upon these different crop combinations as compared to standing corn alone and check dry lot. Record was not made of the yield and area used. The pigs were simply weighed at the beginning and end of the trial. This test furnished a basis for future work.

Soy beans excel cow peas under our conditions as a study of table VII will show.

The hogs getting soy beans made practically .43 of a pound or 35% more average daily gain than the hogs on cow peas. Both the cow peas and soy beans were put in under identical conditions at corn planting time, being drilled in the same row by following the planter. That soy beans should make 619

TABLE VII.—SOY BEANS EXCEL COW PEAS AS SUPPLEMENTAL FORAGE

Ten 82 Pound Hogs to the Acre Were Turned in Cornfield Middle of September, 1909

	No. of Days to Hog-Down the Acre	Average Daily Gain (lbs.)	Hog Gain Accredited to the Acre (lbs.)
Standing Field Corn and Soy Beans*	38	1.63	619
Standing Field Corn and Cow Peas*	42	1.20	504

*Soy Beans and Cow Peas put in at corn planting time; drilled, following planter marks.

pounds of pork to the acre and cow peas only 504 does not surprise men who are familiar with Iowa conditions. Cow peas are better adapted, relatively speaking, to a warmer climate than Iowa affords, they being in their glory in central Missouri or southward of a similar latitude.

WHICH SUPPLEMENTAL CROP IS BEST FOR CORNFIELD?

A comparison of supplemental crops suitable for the cornfield was again made in 1910, rape and pumpkins being compared to soy beans, Canadian field peas and hairy vetch. Table VIII gives the detailed figures and general survey:

TABLE VIII.—WHICH SUPPLEMENTARY CROP IS BEST IN CORNFIELD? RAPE AND PUMPKINS VS. SOY BEANS VS. CANADIAN FIELD PEAS VS. HAIRY VETCH

Ten Spring Shotes Used on the Acre—1910

(Acre Basis Figures)

Supplement to the Standing Corn	W'ght at begin'ing average (Pounds)	When Hogged			Weight during Period Average (Pounds)	Daily Gain Average (Pounds)	Hog Gain Accredited to the Acre. (Pounds)
Rape and Pumpkins	92.3	Sep.	9 *** Nov. 70 Days	18	122.6	.931	651.7
Beans, Soy	92.3	Sep.	9 *** Oct. 51 Days	30	113.1	.828	483.8
Peas, Canadian Field	49.6	July	29 ** Sep. 42 Days	9	64.4	.706	333.8
Vetch, Hairy	92.6	Sep.	9 *** Nov. 70 Days	18	106.9	.418	292.8

*Rape put in at last cultivation: pumpkins shortly after corn was up; beans, peas and vetch drilled in planter marks at corn-planting time.

**Turned in when peas were well podded and beginning to "yellow."

***All corn well dented. Beans podding with leaves green. Vetch growing luxuriantly, almost completely covering the ground. The pumpkins were yellow and the rape about 12 inches high and growing nicely.

The conditions under which these tests were made were similar, the fields lying alongside each other on the same sort of land: any differences therefore are reasonably attributable to the field supplements used.

RAPE AND PUMPKINS

The combination of rape and pumpkins was superior to soy beans, Canadian field peas and hairy vetch; this coincides quite closely with Iowa farm practice.

In these tests there was a fairly good stand of rape and quite a few pumpkins* in the field. The yield of corn in this plot was very good. The combination supplement did not compete seriously with corn for the miosture in the dry fall of 1910, which was fortunate because there was insufficient moisture for a good corn crop, let alone meeting the requirements of another crop whose demands for moisture are great. In this respect rape and pumpkins seem also to have greater relative efficiency than beans, peas and vetch; rape and pumpkins seemingly require a relatively small amount of moisture.

The chemical constitution of rape is such as to make it a better balancer of corn than any of the other crops; this is very important. Furthermore, rape and pumpkins are more palatable generally than soy beans, peas or vetch. Taking everything into consideration on this corn-rape-pumpkins area: the high yield of corn, the good stand of rape with a few pumpkins, the special adaptability of rape as a supplement to corn; the palatability of both rape and pumpkins combined with the vermifugal or worm expelling properties of the pumpkin seed, and the succulence of the two crops, the reasons for the superiority of this combination are clear.

SOY BEANS

That soy beans should rank second to rape and pumpkins and be superior to Canadian peas and winter vetch should be expected. Soy beans reduced the yield less, furnished more edible pasturage and supplied a more practical supplement generally than either the peas or vetch. That soy beans should yield 167.9 pounds less pork to the acre than the rape-and-pumpkins-field is somewhat unusual, probably due to the excessively dry season.

One difficulty with the soy beans that year was that they did not last as long as the corn. Hence the shotes practically finished the experiment on corn alone; the average daily gains the first 36 days were larger as compared to the last 16, respectively, .855 and .763 pounds. It is very noticeable that the gains tend to decrease as soon as the supplement is all eaten.

On the other hand the gains on the rape and pumpkins the first half of the period are less than the last, or respectively, .806 and 1.04 pounds. We may normally expect the gains to increase as the hogs grow older and heavier, providing the supplement holds out, the hogs do not get too fat or well finished, and the young shotes are not forced to live on corn alone.

*Actually about 40 on the acre; much more rape relatively.

CANADIAN FIELD PEAS

Canadian field peas ripen too quickly to make a good supplement to corn; they are a cool weather crop and should be planted about oat sowing time rather than when the corn is put in. Because of the short growing season of the peas, and the early ripening, hogs must be turned upon the corn a little early or else the peas be allowed to go to waste. This lowers the amount of feed which would otherwise be produced in allowing the corn crop to ripen. Furthermore, the peas are not a very efficient supplement to corn because they have too much starch equivalent in proportion to protein, and in addition, because the yield is light under our conditions, this being especially marked in southern Iowa where the climate is warmer. A yield of 333.8 pounds of pork as compared to 150 pounds more, or 483.8, on soy beans or 317.9 more, or 651.7, on rape and pumpkins shows unmistakably the relative inefficiency of Canadian field peas as a supplement to corn for "hogging-down" purposes.

Forage crop tests with Canadian field peas upon which the hogs are grazed and fed corn show quite clearly that as a forage crop for swine, under average Iowa conditions, these peas are clearly excelled by practically all of our standard forages such as alfafa, red cover, rape, blue grass and the like.

HAIRY VETCH

Hairy vetch planted in the cornfield proved to be an utter failure for "hogging-down" purposes. The splendid growth of vetch very markedly decreased the yield of corn in as much as it competed seriously for the moisture which corn should have had. The hogs did not relish the green vetch but would plaintively squeal for other supplementary feed while running knee-deep in it. The vetch was not merely not relished but it was actually distasteful to the hogs, they preferred to root it up than to eat it down. To the Iowa hogman this advice is reasonable: "Do not grow vetch for hog pasture."

The corn and vetch shotes gained less than any of the others, practically half as much as those on corn and soy beans and much less than half of those on corn, rape and pumpkins. The small daily gain of .418 pounds is attributed largely to the insufficiency of a corn-alone diet for 100 pound shotes; there were no weeds in this field from which the hogs could get protein because the vetch had smothered them all out. An average daily gain of .42 pounds is unsatisfactory in the cornfield and in this case vetch shoulders the entire responsibility because of its inefficiency. A comparison of 652 pounds pork made on the acre with rape and pumpkins, and 293 with hairy vetch as a supplement tells its own story.

SUPPLEMENTED AND UNSUPPLEMENTED CORN. IN FIELD AND DRY LOT.

To determine more fully the advisability of using supplements in the cornfield and whether or not they should be home-grown or purchased, and further to compare dry lot fed hogs supplemented and unsupplemented with the "hogging-down" way were the main reasons for conducting another test in 1911.

Six separate lots were fed upon these rations:

Lot 1—Standing corn only in field.
Lot 2—Standing corn plus 10% meat meal in field.
Lot 3—Standing corn plus green soy beans in field.
Lot 4—Standing corn plus 10% meat meal and green rye in field.
Lot 5—Ear corn only in check dry lot.
Lot 6—Ear corn plus 10% meat meal in check dry lot.

The story told by these hogs is found in tables IX and X.

TABLE IX—"HOGGING DOWN" CORN IS PROFITABLE.
Shotes[a] of Seventy Pounds Tell the Story in Fall of 1911.
(Acre Basis)

	"Hogged-Down" in Field				Hand Fed in Dry Lots	
	Standing corn only	Standing corn 10% meat meal *e*	Standing corn Green Soy Beans *d*	Standing corn 10% Meat m l Green Rye *d*	Ear Corn Only	Ear corn10% Meat meal
Yield of Field Corn (bu.)[f]	46.02[c]	50.53	38.64	42.98	44.63	50.76
Meat Meal Fed (lbs.)	None	326.44	None	268.77	None	340.44
Gain on Hogs, total (lbs.)	357.2	795.0	504.4	789.6	410.8	778.6
No. of days	76	58	54	49.5	60	60
Daily Gain, average (lbs.)	.42	1.23	.84	1.44	.62	1.17
Total cost of a hundred lbs. gain:						
Corn @ 40 cents[b]	4.12	3.06	3.11	3.02	4.35	3.70
Corn @ 50 cents[b]	5.41	3.69	3.87	3.56	5.43	4.35
Corn @ 60 cents[b]	6.70	4.33	4.65	4.10	6.52	5.00
Net Returns on the Acre,						
Corn @ 50c and Hogs $5.00	1.47	10.37	5.67	11.37	—1.77	5.04
Hogs @ $6.00	2.10	18.31	10.70	19.27	2.33	12.82
Hogs @ $7.00	5.68	26.27	15.74	27.17	6.44	20.61
A Bushel of Corn Nets after paying for the Supplements with Hogs @ $6.00	47 cents (husked)	78 cents (husked)	70 cents (in field)	87 cents (in field)	55 cents (in field)	75 cents (in field)

a Actually an average of 11.25 shotes to the acre, same number in dry lots.

b Corn in field on stalks charged at 32, 42 and 52 cents—this allowing 8 cents a bushel to husk, crib, store, reload and then feed to hogs. Management and risk assumed to be offset by manure produced and distributed in fields.

c Meat Meal had been fed in the heavier yielding field the year previous, which accounts for the difference of 5.39 bushels. This advantage must be given where it is due.

d Production cost on rye and soy beans was $3.33 extra on the acre for seed and labor (see table XII). Fortunately the rye holds over, but this next season's crop is not credited in figures given.

e Fed in same amount daily as to the check dry lot, ear corn plus 10% meat meal.

f All corn reduced to 14% moisture (or 86% dry matter) basis, making it safely No. 2.

The cost of a hundred pounds gain is materially lessened by the feeding of a supplement in the cornfield, whether it be home grown or purchased. That is the striking lesson of the figures in tables IX and XIII.

Shotes in standing corn only, produced gains costing* $5.41 per 100 lbs., with corn at 42 cents. When 10 per cent of meat meal, costing $2.50 a hundred, was added to the ration, the cost of gains was cut down $1.72, or practically 32 per cent. Tankage, skim milk, buttermilk or oil meal at reasonable prices would have given much the same results. Furthermore, through the use of meat meal, the rapidity of gain was increased .81 pounds daily or from .42 to 1.23 pounds, an increase of almost 66 per cent. In view of such facts, the value of a supplement with pigs averaging 70 to 140 pounds is apparent.

VALUE OF HOMEGROWN SUPPLEMENTS IN THE CORNFIELD

While the test did not show quite as large benefits for supplements grown in the corn field as for meat meal yet such supplements as soy beans and winter rye made the fattening of pigs much more profitable than when no supplement was used. Unfortunately a field was not available for a test of rape.

Where soy beans** were used, the pigs gained 100 per cent more than pigs that received no supplement. Besides, the cost of gains was decreased $1.54 or practically 29 per cent. On green rye** the results were also satisfactory. Where the meat meal was used with the rye gains were not only three times as rapid as in the check cornfield without supplement, but also the cost of gain was $1.85 per 100 pounds less, or almost 35 per cent.

It is worth mention that the rye crop which is the second choice of the practical farmer, rape being first, should likewise show up to be especially valuable in these definite experiment trials.

It should be remembered that in the purchasing of a supplement such as meat meal, or oil meal high in protein and mineral nutrients that manurial benefits likewise accrue therefrom as in the growing of home-field supplements.

That the hogs in the cornfield rightly managed made more rapid and economical gains than those in dry lot is significant. In charging the corn in dry lot we have assumed that it costs 8 cents to husk, haul to the crib, unload, reload and haul back to the hogs; this including board, wear and tear on the wagon, horse labor and so on. The average farmer's cost of husking and marketing*** is 8.81 cents. If one prefers to use another basis he can readily refigure from the original data. Reference to table X shows that 408.8 pounds of feed were required for a hundred pounds of gain in dry lot, hogs getting corn and meat meal, while

*See table XIII for production costs.
**Manurial value of green crops assumed to offset detraction in corn yield..
***See table XVII.

TABLE X.—CORN IS EFFICIENTLY "HOGGED-DOWN" UNDER GOOD MANAGEMENT

Feeding Record of 1911 Trials, Average of 11.25 Hogs to the Acre.[a]

	"Hogged-Down" in Field				Hand Fed in Dry Lots	
Corn, How Fed	Standing Corn Only	Standing Corn 10% Meat Meal	Standing Corn Green Growing Soy bean	Standing Corn 10% Meat M'l Green Gwg Rye	Ear Corn Only	Ear Corn 10% Meat Meal
When fed	Sep. 19 Dec. 4	Sep. 19 Dec. 4	Sep. 19 Dec. 4	Sep. 19 Dec. 4	Sep. 19 Dec. 4	Sep. 19 Dec. 4
Days, number	76.0	58.0	54.0	49.5	60.0	60.0
Wt., average at beginning	69.5	69.0	68.3	60.0	69.3	69.0
Wt., average at close	101.7	140.5	113.7	140.1	106.3	139.1
Gain, average daily	.42[b]	1.23	.84	1.44	.62[b]	1.17
Shelled corn, average daily[d]	3.05	4.39	3.61	4.38	3.75	4.26
Meat meal, average daily	None	.51	None	.48	None	.51
Grain, total average per 100 lbs. live weight daily	3.37	4.79	3.86	4.38	4.19	4.64
Grain for 100 lbs. Gain:						
Shelled corn	721.5[c]	356.0	429.1	304.8	608.51	365.1
Meat meal	None	41.0	None	34.0	None	43.7
Total shelled corn, meat meal	721.5	397.0	429.1	338.8	608.51[b]	408.8

a Ten hogs were used on .9 acre of standing corn; same number in dry lot.

b The longer young shotes are kept upon corn alone the more unprofitable and less rapid the gains generally; these shotes gained .727 first thirty days and required 544 pounds for a hundred pounds of gain; while second thirty days they made only .50 at an outlay of 702 pounds corn. Manifestly had this record continued sixteen days longer the results would have been equally as unfavorable as in the standing corn alone in field lot, (which see).

c Poor showing due to long continuance on corn alone. These hogs went off appetite after first fifty days, they having eaten practically all the weeds in corn at this time. They craved protein and ash food. It was not supplied. Muddy, wet weather came on with resulting disagreeableness to hogs and waste of some corn. Had these shotes received a supplement they would have cleaned up the field quickly and made a good showing.

d All corn reduced to 14% moisture basis, making same safely No. 2.

only 397* pounds were needed in the field. Charging the corn at same price for a bushel in dry lot and field and we still have the cornfield in the lead financially.

Unfortunately the hogs in the corn-alone-field went off in appetite toward the close of the trial and it was necessary to keep this lot in the cornfield during wet muddy weather to make them clean up, or from November 18 to December 4, after all the other hogs had been taken out. However, the record on this lot does not detract from the value of "hogging-down." It is clearly shown that corn should not be fed alone in dry lot or in the field to young shotes so one had best leave these two lots out in considering the practicability of "hogging-down" corn.

*The grain required for a hundred pounds gain is shown in the Minnesota Station (Bulletin 104, by Gaumnitz, Wilson and Bassett) to be greater in dry yard than in cornfield. An average of two years gives 735 (614 ear corn and 121 shorts) pounds required in "hogging-down," and 859 (702 ear corn and 157 shorts) pounds in dry yard. "The hogs in field gained nearly one-third more rapidly than those fed in yards."

COMPARATIVE PRODUCTION COSTS OF CORNFIELD-MADE PORK.

In a study of hogging-down, it is important to know the actual cost of growing an acre of corn alone as compared to growing it with supplements and also the cost of cornfield-made pork, disregarding the value of the corn on the stalks and using the costs of rent, preparation, seed, planting and cultivation instead. These facts will give an idea of the comparative value of different systems of field management for "hogging-down."

To grow an acre of corn up until husking time costs about $11.15. The detailed figures are presented in table XI.

TABLE XI.—APPROXIMATE COST OF GROWING ACRE OF CORN.*
(Not Including Harvesting)

Rent on land	$ 6.00
Plowing	1.70
Discing, double	.60
Harrowing, twice, at 15 cents each	.30
Seed	.40
Planting	.35
Cultivation, four times, at 45 cents each	1.80
Total acre cost to husking time	$11.15

*The Government Bureau of Statistics gathered farmer's field costs of growing corn in 1909, getting an average acre cost up to husking time of $10.08; however, rent is charged at only $4.63.

To supplement the corn crop calls for additional seed and some labor. These extra costs for different field supplements are given in table XII.

TABLE XII.—ACRE COST OF GROWING CORN SUPPLEMENT.

Supplementary Crop	Year Used	When Planted	Rate of Seeding Pounds	Supplementary Crop Charges			Total production cost, corn @ $11.15 an acre
				Seed $	Seeding $	Total $	
Rape, Dwarf Essex	1910	Last cultivation	3	.24	.16	.40	11.55
Rape and Pumpkins	1910	Rape, last cultivation Pumpkins, after corn is up.	3 1	R .24 P .35	.41	1.00	12.15
Rye, Winter	1911	Drilled in after last cultivation.	136.5	2.73	.60	3.33	14.48
Beans, Soy	1909 1910 1911	Drilled, corn planting time.	45.5	2.73	.60	3.33	14.48
Peas, Cow	1909 1910	Drilled, corn planting time.	45.5	2.73	.60	3.33	14.48
Peas, Canadian Field	1910	Drilled, corn planting time.	60	3.00	.60	3.60	14.75
Vetch, Hairy	1910	Drilled, corn planting time.	45	5.40	.60	6.00	17.15

Prices charged for supplementary crop seeds in table XII are:

	For a Bushel	Pound
Rape, Dwarf Essex	----	$ .08
Rye, winter	$1.20	.02
Beans, Soy	3.60	.06
Peas, Cow	3.60	.06
Peas, Canadian Field	3.00	.05
Vetch, winter	7.20	.12
Pumpkins	----	.35

The low production cost of corn and rape as compared, for instance with corn and soy beans is striking, there being a difference of $2.93 in favor of the farmers' favorite, Dwarf Essex Rape. The production cost on rape and pumpkins is but slightly more, just 60 cents, than rape alone. Winter rye has a fairly high production cost, $14.48, but the crop holds over the second year ordinarily and is entitled to credit for that.

The comparative production cost of pork made by hogging-down corn is presented for the different systems of field management in table XIII.

The cheapest pork made in the cornfield with any combination was made with rape and pumpkins at a cost of $1.86 a hundred pounds. It is entirely probable that rape without the pumpkins would show practically as satisfactory results. That soy beans should excel cow peas is expected but that rape and pumpkins excel both is the important thing.

TABLE XIII.—COMPARATIVE PRODUCTION COST OF PORK MADE IN CORNFIELD*a*. SUPPLEMENTED VS. UNSUPPLEMENTED CORN

Three Years of Work—1909-10-11
(Figures on Acre Basis)

Supplement, if any, to Standing Corn "Hogged-Down"	Year	Initial weight of shotes (Pounds)	Pounds of pork produced	Cost of growing crops	Comparative cost of a hundred pound of pork made
Beans, Soy	1909	82	619.0	14.48	2.34
Peas, Cow	1909	82	504.0	14.48	2.87
Rape and Pumpkins	1910	92	651.7	12.15	1.86
Beans, Soy	1910	92	483.8	14.48	2.99
Peas, Canadian Field	1910	50	333.8	14.75	4.42
Vetch, Hairy	1910	93	292.8	17.15	5.85
None	1911	69	357.2	11.15	3.14
Meat Meal 10%	1911	69	795.0	19.32*c*	2.43
Beans, Soy	1911	68	504.4	14.48	2.87
Rye, Green and Meat Meal, 10%	1911	69	789.6	21.20*c*	2.69

a Value of mature corn grain in field not taken into consideration. Cost of growing an acre of corn to husking, or $11.15 used as a basis. (See Tables XI and XII). Manifestly this table shows only the relative value of different methods of "hogging-down"—and is not a final cost figure; on the farm in practice we charge the hogs with the corn in the field regardless of the rent, preparation, seed and labor costs on the same. The relative efficiency of different cropping and management methods or "hogging-down" is clearly depicted, however.

c Includes the cost of the supplement purchased.

That corn alone is hogged-down at a relatively high cost with young shotes is shown in comparing the cost of that method, $3.14, with the cost where a purchased supplement was used, $2.43. It is now pretty well demonstrated that standing corn alone for young shotes should be supplemented by having a pasture run, crops in the cornfield, or purchased supplement; or still better, by a happy combination of some two of these.

The inefficiency of hairy vetch and Canadian field peas is again clearly outstanding. These two crops produced pork at the highest cost of any of the methods used. It reflects the good judgment of the farmer that out of the 194 men answering inquiries not one used either Canadian field peas or hairy vetch.

SUPPLEMENT NECESSARY FOR FORAGE GROWN SPRING SHOTES.

To determine further the advisability of feeding supplement to spring shotes weighing on the average from 160 to 170 pounds, four forage-grown lots of 10 pigs each were full fed on shelled corn for 60 days with different proportions of meat meal containing 60%of protein. The gains were not only more rapid, but the feeds required for a hundred pounds gain less, where a reasonable amount of supplement was fed in addition to corn. The marked saving by using supplement is shown in table XIV; 60% meat meal added to corn in this 60-day test proved best.

TABLE XIV.—SUPPLEMENT TO CORN* IS REQUIRED IN FATTENING FORAGE GROWN SHOTES.

Ten 130 Pound Shotes Started in Each Lot—1912
Average Weight During Period 160 to 170 Lbs.

Ration	Av. daily gain	Feed required for 100 lb. gain			Cost of 100 lb. gain, corn @ 50c, meat meal $2.50 cwt.
		Corn	Supplement	Total	
Corn only	.898	563.1	None	563.1	5.03
Corn plus 4% Meat Meal	1.207	458.1	19.5	477.6	4.58
Corn plus 6% Meat Meal	1.435	400.6	25.6	426.2	4.22
Corn plus 8% Meat Meal	1.455	392.0	33.3	425.3	4.33

These figures bring out thoroughly the advisability of feeding supplements to 125 pound shotes in the cornfield; these had an average weight of 160 to 170 pounds during the period and yet they craved and needed the supplement.

*Reduced to 14% moisture basis, making safely No. 2.

RELATIVE VALUES OF DIFFERENT SUPPLEMENTS.

If a pasture supplement is not available it is quite imperative in securing rapid and cheap gains with young growing shotes that a purchased supplement be used. Of the farmers reporting, 52% use meat meal or tankage, 44% skim milk, 29% oil meal, 18% middlings or shorts, and so on. These supplements are all

efficient and the choice will depend upon the relative current prices. Ordinarily, when corn is worth 50 cents and hogs $6.00 and skim milk can be bought for 25 cents a hundred, "Old Process" linseed oil meal is worth about $1.50, and 60% protein tankage or meat meal, $2.50. However, a combination of these feeds is better than any one alone providing they can be advantageously mixed.

An adjoining pasture for the hogs to run in when they are "hogging-down" corn is practical. This pasture should preferably be alfalfa, rape or red clover; blue grass does not balance corn to any great extent. Insofar as balancing corn is concerned, rape excels all other crops; the difficulty with rape as compared to alfalfa, the greatest hog forage, is that it is not such a heavy yielder as alfalfa, hence will not make as large profits on the acre basis. The important thing is that less purchased supplement will be required when the hogs in the cornfield have the run of a rape pasture than when they have the run of any other. Rye pasture is quite widely advocated by some of our hogmen but our experience is that rape is better for an emergency crop; the chief difficulty we have had with rye is that it tends to produce undue laxativeness.

ESSENTIALS OF A FORAGE CROP SUPPLEMENT.

In selecting an ideal forage crop supplement for the cornfield a number of essentials must be considered:

The crop should be, first, adaptable to local soil, climate, and the particular corn-growing season.

It should be palatable.

It should not detract from the corn yield to any extent, which means it should not make heavy demands upon soil moisture which would be especially disastrous to the corn crop in a very dry season.

It should be able to grow quickly at the last cultivation and produce considerable forage.

It should be easily seeded without much undue labor.

It should be seeded at reasonable low cost.

It should be a fairly sure crop to be dependable.

It should be a comparatively heavy yielder of digestible protein and mineral nutrients with relatively little coarse crude fiber.

It should have a high proportion of protein to starches or carbohydrate equivalent.

It should be succulent.

It should preferably be a legume to collect nitrogen from the air through the harbored bacteria and thus insure the upkeep of fertility.

It should tend to prevent weed growth.

It should leave aftermath or stumps upon the ground to prevent the land from winter erosion.

With these ideals to work to we find that the crops which come most nearly meeting them in a general way in order of

the best first are rape (and pumpkins); rye (or wheat); soy beans (and possibly red or mammoth clover); and cow peas. Canadian field peas and winter, hairy vetch are considered impracticable.

RAPE

The high content of protein and mineral nutrients in rape, which is the chief reason for its being selected as a supplement to corn, is well brought out in table XV.

TABLE XV.—COMPOSITION OF DRY MATTER IN CORN AND ITS CROP SUPPLEMENTS, RAPE, ALFALFA, RYE, SOY BEANS, BLUE GRASS

Pounds in a Hundred.* (Edible Portions.)

	Protein (Muscle, bone, cartilage, blood, hair, hoof, etc. builders)	Mineral Nutrients. (Bone, hoof, teeth, blood, etc., constituents)	Starch or Carbohydrate equivalent. (Energy, sugar and fat producers)	Pounds of Carbohydrate equivalent to a pound of Protein
Corn	11.46	1.66	93.67	9.05
Rape	36.57	12.07	56.93	1.56
Alfalfa	30.69	11.03	60.85	1.98
Rye	24.85	12.03	48.14	2.81
Soy Beans	23.29	10.78	68.13	2.93
Blue Grass	11.06	11.14	81.21	7.34

THE BEST SUPPLEMENTS TO CORN ARE RICH IN PROTEIN AND MINERALS —AND CONTAIN MUCH PROTEIN IN PROPORTION TO STARCHES.

*All analyses done by Prof. A. W. Dox, W. C. Gaessler and S. C. Guernsey of the Chemical Section.

The edible portion of the dry matter in rape contains 36.57% protein, putting it ahead of alfalfa, rye and soy beans, as the leading protein green feed supplement. Furthermore, rape contains more protein in proportion to starches or carbohydrate equivalent than the other crops, or, put in another way, rape contains 1.56 pounds of carbohydrates to each pound of protein whereas alfalfa contains practically 2, and blue grass more than 7. This really means that the edible dry matter of rape is more nearly pure protein than that of the other forages. Further, rape has more mineral nutrients, which go to make up the framework of the body. In these facts are the reasons why rape is such a high quality supplement to corn. It supplies what corn lacks.

If there is failure to get a stand of rape, the farmer is out very little in expense and labor; practically always, however, there will be a good stand around the edges of the cornfield where the sunlight penetrates more thoroughly. It is a good plan to sow rape in the outer four or five rows of corn even though the stand is thick, putting it in at the last cultivation.

In northern Iowa rape will usually do better in the corn than it will in the southern portion because of less corn-plant shade. The illustration, fig. 2, of rape in a northern Iowa corn-

field was of a 1912 crop which yielded the magnificent growth of over two feet in conjunction with a 95 bushel crop of corn. In southern Iowa a 75 bushel yield would give more shade and the rape would not do so well. Adaptation to the environment is of practical importance.

Fields in which the rape has a good growth late in the fall are usually free from weeds; the luxuriant, shady, spreading leaves smother them out. This is an added advantage of rape.

The sowing of rape and corn in alternate rows for "hogging-down" purposes has been practiced to a limited extent. Just whether or not this is a practical method we have no data to show; to grow corn and rape in separate fields is a more promising practice than this. One can hardly afford to cultivate rape in the good rainfall sections of Iowa.

Rape may be drilled in with a one-horse drill sometime after the last cultivation. The disadvantage of this method is that the rape is planted somewhat late; ordinarily it is desirable to get it in as early as possible. On the other hand there is the advantage of having a stand which will probably be more uniform throughout the field and in addition the depth of planting can be gauged so as to insure a more rapid growth depending upon the season. The drier it is the deeper the rape seed should be put in and vice versa. If the drilling is not delayed too late so as to cut the brace roots on the corn which form late in season the cultivation may probably add somewhat to the yield.

RYE

Rye as a green crop has a fairly good content of protein and mineral nutrients. It has given success in practice. At the Station the chief objection to it is its somewhat washy character (wheat being much better in this regard) hogs running on it, especially if they are young, are especially liable to serious scours. However, if the hogs have no diarrhoea upon rye it is a good supplement. The chances of getting a "catch" in the last cultivation are not so good as with rape; furthermore the cost of seeding is greater, and the probabilities are that the detraction from the corn yield will be somewhat larger.

SOY BEANS

The Japanese imported plant, soy bean, makes a very good growth in practically all sections of Iowa. Rather than grow no supplement it would be preferable to sow soy beans. They detract from the yield to a considerable extent, especially in dry season; to secure best results they will necessarily have to be sowed at corn planting time. The cost of seed at the present time is high, the labor of seeding is an item to be considered unless one has a bean attachment for the corn planter, the

yield in a dry season will be seriously lessened, and unless a very good stand is secured the beans will be gone before the corn is "hogged-down."

All standard forages, such as alfalfa, rape, red clover and blue grass, under present existing commercial conditions clearly excel soy beans as forage crop supplement to corn when sown alone; recent tests at the Iowa Station in 1912 clearly demonstrate this.

The station has used two varieties, the black beauty or ebony and the medium early yellow; the former gave the better results. Black beauty beans put in at the time of corn planting will be well podded if the corn is turned into about September 20th. Our soy beans gave better results when inoculated,* the soil method being used.

About 45** pounds to the acre drilled in the corn rows will give an excellent stand; one can plant alternate rows of beans and corn if deemed advisable; some prefer this method but under Iowa conditions it is doubtful.

COW PEAS

In centra Iowa, cow peas, a warm weather plant, has been inferior to soy beans. In southern latitudes, however, cow peas make an excellent growth, relatively better than soy beans which is natural as they thrive best in a warm climate.

Success in getting stands of cow peas (soy beans as well) at the last cultivation is problematical; successful growth is very uncertain because of the probable dry seed bed. The animal husbandry section has had considerable difficulty in getting a stand of cow peas or soy beans in the corn at the last cultivation even though it was drilled in, and the seed placed deep enough to meet the moisture. Broadcasting gave even more unsatisfactory results. The only successful trial with cow peas was made in 1909, these being put in at corn planting time; the best time to sow cow peas is about a week later than the time of planting corn.

Detracting from the corn yield is one of the chief difficulties with cow peas as well as with soy beans. The lessening of the yield may run from 2 to 8 and even more bushels per acre, this depending largely upon the fertility of the land and the rainfall during the growing season. Corn growers object to this loss in yield of corn because primarily they are in the corn raising business. To overcome this serious objection they either sow rape, which does not detract materially from the yield of the corn, or else depend upon pastures growing in another field. These may be either one or many such as clover, rape, alfalfa, blue grass and white clover.

*The Farm Crops Department recommends inoculation on most Iowa soils.—H. D. Hughes.

**Have used 30-35 pounds satisfactorily with varieties producing small seed.

COMPARATIVE RAPIDITY AND CHEAPNESS OF GAIN.

"How do the rapidity and cheapness of gains of the hogs in the cornfield compare to those fed corn in dry lot on pasture?" was another question put to practical farmers.

It was answered by 177 men. Some of their expressions are to the point:

"Gain more rapidly, and in addition save time and labor in husking and feeding."

"Not much difference in rapidity, but the gain is cheaper."

"Fresh clover pasture with hogs in the cornfield makes better gains than anything I ever tried."

"Fully one-third faster in the cornfield."

"The difference is much in favor of 'hogging-down' if there is a good stand of rape."

"Hogs do better, grow faster and are in better tone; never lost a hog in cornfield."

"Lots better; I always give them free access to pasture, water and salt. They gain more rapidly, their flesh is more solid and they are better feeders when they come out of the cornfield."

"It beats feeding in dry lot two to one."

"Small bunch can be made to gain as much in the cornfield as a large herd in dry lot but it takes more work."

"I believe 20 bushels of corn in field will put on as much as 25 bushels fed in dry lot."

"The gain in fatness is not so much in the cornfield but the hogs rustle and develop large, sturdy frames for later successful dry lot feeding."

"I compared 12 acres of corn in field sown to rape with the same yield, or 1,000 bushels, on blue grass and I could not see but what the hogs in the cornfield made as good gains."

"Double those in dry lot but nothing can outdo good pasture and dry corn for rapid gain."

"If I could secure right kind of help I would rather gather my corn and feed it for most rapid gains, however, the hogs save me 6 cents a bushel by 'hogging-down'."

"Never got such rapid gains any other way; they are cheaper."

"They do better than dry lot but only a little better than those on pasture."

"Cheapest and best gains in cornfield but are finished better in dry lot without much exercise."

"Hogs gain one-fourth faster than in dry lot and put on 12 pounds of pork for a bushel without tankage in the field as compared to 10.5 in dry lot with tankage."

Summarizing the replies in table XVI we find that 80% say the gains are more rapid in the cornfield, 59% more economical, 6% see but little difference, while less than 2% say they are less rapid and only one-half of 1% less economical.

It is a good plan not to make the fat hog clean the fields too closely but to take them to the dry yards and hand feed. Tests here show that it is comparatively unprofitable to make the fairly well finished hog exercise too much; the last month or so of fattening he should be confined fairly closely. Mak-

TABLE XVI.—"HOGGING-DOWN" EXPERIENCE OF 177 FARMERS AS TO RAPID AND ECONOMICAL GAINS IN CORNFIELD. COMPARED TO DRY LOT AND PASTURE FEEDING

In "Hogging-Down" Gains are,	Number Reporting	Per Cent Reporting on Each Comparison
More rapid	141	79.67*
More economical	105	59.32
But little different	10	5.65
Less rapid	3	1.69
Less economical	1	.56
	260*	

Concerning the relative rapidity and cheapness of gains. When "Hogging-Down" is compared to dry lot or pasture, 93.79% (or 166 of 177 men reporting) are favorable to the corn field system, 5.65% (or 10) see but little difference, while only .56% (or 1) are unfavorable. This one man may be quoted: "If I could secure right kind of help I'd rather hand feed for best gains." Relative economy is not mentioned but it is understood that the gains are satisfactory as he thinks "Hogging-Down" profitable.

*Some reported on more than one comparison.

ing the fat hogs clean the field when only a few scattered kernels are left is a losing proposition.

That the opinions of a surprising majority of over 93 out of every 100 practical men reporting should coincide closely with the experimental figures of the Iowa Station means that the deductions are entirely correct within all reasonable probability.

COST OF HUSKING AND MARKETING CORN AND THE SAVING BY "HOGGING-DOWN."

Two other questions put to farmers were: "What do you figure it costs you per bushel to get corn out of the field and to market, counting labor, (man and horse), board, time, repairs and everything?" and "How much per bushel do the hogs save you in harvesting their own corn in comparison to feeding it to them on pasture and in dry lot?" was inquired.

To give an adequate idea of the relative husking and marketing costs on corn, the different estimates are presented in table XVII.

TABLE XVII.—COST OF HUSKING AND MARKETING A BUSHEL CORN.
148 Farmers' Experience

Cost to Harvest and Market. Av. (cents)	Number Reporting	Per Cent for Each Range in Cost
5- 6	24	16.22
7- 8	47	31.75
9-10	54	36.49
11-12	16	10.81
13-15	5	3.38
16-17	2	1.35
Total	148	100.00%

AN AVERAGE COST FROM FIELD TO MARKET OF 8.81 CENTS A BUSHEL.

The average cost of getting corn out of the field and to market, taking 148 farmers' experiences into consideration, is 8.81 cents a bushel. In our previous figures we have made a difference between standing corn in field and dry lot husked price of 8 cents on the bushel of corn, which difference is corroborated in a large measure in this summary of experiences. At first thought one may be somewhat surprised to know that the cost mounts up close to 9 cents, but when one figures carefully he readily sees that there are a hundred and more odd expenses which enter into the transaction that are usually neglected in the figuring.

Some of the quotations given from the answers to this first question are especially significant to the live stock men:

"Do not market any corn as such."
"Feed all we raise."
"Never sold any corn, feed it all."
"I never hauled but two loads to market in my life."
"I never sold any, I buy it."
"I market corn only through live stock."
"Our corn does not go to market that way."
"I have my first load to sell yet."
"It is worth a great deal more to me to have a team and man haul manure than what it actually costs, hence instead of husking the corn I let the hogs do that and haul the hogs away."

What the hogs save in husking and cribbing expenses by hogging it down themselves is of considerable interest, hence a summary of these savings as reported by 158 farmers is briefly given in table XVIII.

TABLE XVIII.—SAVING ON THE BUSHEL BY "HOGGING-DOWN" CORN

158* Farmers' Experience

Saving in Cents	Number Reporting	Per Cent for Each Range in Saving
0- 2	3	1.90
3- 4	8	5.06
5- 6	81	51.26
7- 8	33	20.89
9-10	19	12.03
11-12	7	4.43
13-15	6	3.80
16-20	1**	.63

AN AVERAGE SAVING OF 6.80 CENTS ON EVERY BUSHEL HARVESTED BY THE HOGS.

*36 made no estimate.
**Credits extra gain which is attributed to the bushel when "hogged-down" as compared to ordinary feeding.

That the hogs should make an average saving of 6.89 cents on every bushel harvested is no small item. It means a saving of $4.13 on an acre yielding 60 bushels in corn. When the average number of acres are "hogged," or 18.9 acres as reported by some 30 men,* there would be a saving of $78.05.

*Table XXII gives details on this.

These practical opinions on the saving in hogging-down are full of meaning:

"Save 5 cents on husking besides my time for feeding the corn, keeping feed floors clean, hauling out the manure and the loss of some of the fertility in the yards before I get it to the fields."

"Early in the fall time is precious to unhitch from the plow and get corn for the pigs, they save a large amount of work which is actually worth more on this farm than it costs."

"More than 10 cents as man and team can plow and do other productive work.....we would need another man if we had to feed these hogs.....they save more than the mere charges against husking and feeding."

"Enables us to fall plow and thus prevent rush of spring work."

"Saves price of husking, feeding and the bother of having a man around."

"It costs money to husk corn, feed the hogs, and distribute the manure; hogs in the cornfield save this."

"Does away with cribbing charges and lessens crib space required."

THE BEST CLASS OF HOGS FOR "HOGGING-DOWN."

To give an adequate idea of the size of hogs chosen for the cornfield, the experience of 187 men is tabulated in table XIX.

TABLE XIX.—HOGS PREFERRED FOR "HOGGING-DOWN" CORN
187 Men Give Experience

Class of Hogs Used in Cornfield	Number Reporting	Per Cent Using Each Sort
Spring shotes	175	93.58
All sizes[a]	52	27.81
All fattening hogs[b]	12	6.42
Old sows (to be fattened off)	9	4.81
	248[c]	

A GRAND AVERAGE WEIGHT OF 135 POUNDS TO THE HOG—WITH AN AVERAGE RANGE FROM 101 TO 170 POUNDS.

a Counted also with spring shotes.
b Presumably well-grown.
c Some men use two or more classes of hogs in fields.

Spring shotes, farrowed probably in March, April and May and well-grown on forage until they reach a weight of approximately 100 to 170 pounds, were used for "hogging-down" purposes by over 93% of the men reporting. That shows an overwhelming preference. That all of the fattening hogs, including the old sows should be turned into the cornfield by many quite clearly shows that this method is thought excellent for putting fat on the well-grown frame.

The preference of farmers for young hogs is quite clearly brought out in their expressions:

"Young hogs are best."
"Mostly spring shotes."
"Pigs about 7 months old."
"Everything but old sows."
"Use brood sows after fattening hogs are yarded up."

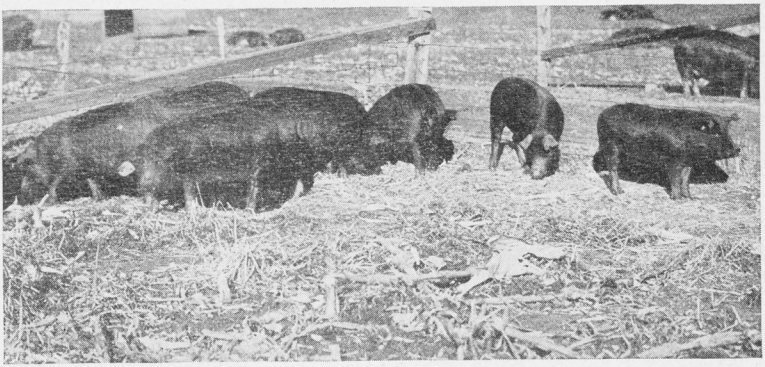

Fig. 3.—Shotes are the corn field favorites.

"Young shotes, but use old sows if area is small."

"Shotes because they eat up clean as fast as they knock the corn down."

"Fatten the old sows in the cornfield as well as the spring shotes that we intend to market in January."

"Use all fattening young shotes and thin hogs—also leave gilts in that are intended for breeding for awhile but do not let them get too fat."

"Use all sizes, fattening hogs first then let the sows and little pigs follow up."

"April spring pigs of 100 pounds that have been started on sweet corn."

"Plenty of young shotes with a few large ones, old sows and the like, to break it down."

"Always good idea to turn in shotes with older hogs, they pick up the kernels."

The men generally are using young shotes for the major portion of the "hogging-down," being especially careful not to use too many old sows or heavy hogs that will break down an excess of corn, unless the range is limited. They have learned from experience that following up with brood sows late in the season is an excellent idea because it cleans up the fields, gives the sows plenty of excellent and needed exercise, and furnishes these sows in addition a lot of mineral food gathered on the range which they would otherwise likely not receive.

PORK FROM A BUSHEL OF "HOGGED-DOWN" CORN.

The question, "How many pounds of pork do you believe you get for a bushel of corn when the hogs gather it themselves?" was well answered.

An average pork production of 12.02 pounds to the bushel of corn was reported by 62 men making estimates. That is an

especially good showing for the "hogging-down" way of harvesting the corn crop.

The range in the pork produced from a bushel of corn eaten is given in table XX. A survey of this summary is quite interesting and instructive.

TABLE XX.—PORK FROM A BUSHEL OF "HOGGED-DOWN" CORN

62* Farmers Making Estimates

Pork Made From a Bushel	Number Reporting	Per Cent for Each Range in Production
7- 8	6	9.68
9-10	17	27.41
11-12	16	25.80
13-14	10	16.13
15-16	9	14.52
17-18	2	3.23
19-25	2	3.23
Total	62	100.00%

AN AVERAGE PORK PRODUCTION OF 12.02 POUNDS TO THE BUSHEL OF CORN.

*14, or 17.50% of all reporting, say they make more pork in cornfield from a bushel of corn than any other way; 4, or 5%, give cornfield credit for being ideal for pork production.

That 53.21% should give their estimate at from 9 to 12 pounds shows that the pork production is generally somewhat above the commonly accepted 10 pounds to the bushel when the hogs feed themselves; 12.02 pounds on the average is 2.02 pounds more than is commonly accepted as the pork producing value of a bushel of corn.

In their own words, Iowa farmers have this to say upon this point:

"Ten to fifteen pounds gain a bushel depending upon the age, size and condition."

"Ten pounds in the cornfield alone or 12 when I have clover in addition."

"Hogs make more pork than when I hand feed them, but labor is greater."

"Twelve pounds if the corn ration is balanced."

"Our hogs made 735 pounds gain to the acre in 1910."

"Scales tell me that I get 10 to 15 pounds to a bushel when corn is fed in conjunction with rape."

"Get 10 to 12 pounds of pork per bushel in the field when I feed tankage and only 7 pounds when I do not."

"To get the most pork it is necessary to have the required rape or grass for balancing the corn ration."

THE EXPERIMENTAL FIGURES ON PORK FROM A BUSHEL OF CORN

The pork producing value of a bushel of corn as estimated by the men from all over the state is corroborated by the practical feeding tests of the animal husbandry section. The exact experimental figures show that the pork value of a bushel of corn when "hogged-down" ranged in the 1911 trial from 7.76 to 13.05 pounds, the larger value when a supplement is

used, be it either home-grown, or purchased, or a combination of both. The relative pork producing values on the bushel basis of the different systems of management are expressed in the following table XXI.

TABLE XXI.—PORK FROM A BUSHEL OF CORN*
Standing vs. Husked, Hand-Fed Corn
Supplemented vs. Unsupplemented Corn
1911 Results

How Fed	Supplement, if any	Pork Made from Each Bushel of Corn Fed
Standing in field (Hogged-Down)	None	7.76**
Standing in field (Hogged-Down)	Meat Meal, 10%	15.73
Standing in field (Hogged-Down)	Meat Meal, 10% and Green Rye	18.37
Standing in field (Hogged-Down)	Soy Beans	13.05
Ear Corn, hand fed in dry lot	Meat Meal, 10%	15.30
Ear Corn, hand fed in dry lot	None	9.20

*These figures place all credit on the bushel of corn and do not account for that due to supplement. Manifestly it is demonstrated that the corn makes more pork where supplements are judiciously used.

**This figure is somewhat low because of the fact that the young shotes in this field went off appetite due to long continuance on corn, and toward the latter end of period heavy, cold, wet rains brought mud with corresponding disagreeableness and some waste. See table X.

That 18.37 pounds of pork should be made for every bushel of corn in the field when green rye was present and meat meal fed in addition illustrates the pork producing value of a bushel of corn when properly supplemented. It is interesting to note that where corn is handled advantageously that as much pork is secured in the cornfield, if not more, than in dry lot* for each bushel of corn eaten.

THE SIZE OF FIELD TO USE.

The question, "What size fields do you use?" brought much good information. Some of the statements follow:

"The more hogs you have and the heavier they are the more area you can turn in on so as to make them clean up in a month."

"We make ours clean up in from 10 days to 2 weeks and then change the field."

"Eight spring shotes to the acre of 40 bushel corn."

"Prefer small fields, 3 to 10 acres."

"Size of field makes no difference so long as they clean up before heavy rains come or snow flies."

"We used 106 head this year on 10 acres and they cleaned up in 32 days."

*Minnesota Experiment Station quote from a study of their tests that more pork was produced from a bushel of corn when properly hogged than when fed in dry yards.

A summary of the field area turned into as well as the average number of hogs to the acre is found in table XXII.

TABLE XXII.—SIZE OF FIELD TURNED INTO
165 Men Giving Area

Field Area. Acres	Number Reporting	Per Cent for Each Classification
1- 4	24	14.55
5- 9	51	30.91
11-19	48	29.09
21-29	15	9.09
31-39	14	8.48
40 and up	4	2.42
Various Areas	9	5.46
	165	100.00%

AN AVERAGE FIELD OF 18.9 WITH AVERAGE VARIANCE FROM 13.3 TO 24.5 ACRES. AN AVERAGE OF 13.1 HOGS, REPORTED BY 30 MEN, RANGING FROM 11.2 TO 15 TURNED INTO THE ACRE.

The average field used is practically 19 acres. The men who stated the number of hogs show an average of from 11.2 to 15 on the acre, or practically 13 on the average. Assuming that these hogs had an average weight of 135 pounds this would make almost 1800 pounds of hogs to the acre. Ordinarily on 50 bushel corn land 13 hogs such as these would clean up the field in about 40 to 50 days.

The general principle of confining old matured hogs, especially sows, more closely than young shotes in order to prevent the knocking down of too much corn with its possible resultant waste is emphasized. If the wind has blown the corn down, hogs should be confined to smaller areas if they be of the heavy, well-grown type. That smaller fields of 5 to 9 acres should be preferred by over 30%, shows definitely that advantages accrue from using small areas.

Other things being equal, (1) the larger the number of hogs used, (2) the bigger the hogs, (3) the better grown they are (not being fat), (4) the better their appetites (stimulated economically by home-grown or purchased supplements), (5) the lighter the yield of the corn, (6) the less the danger from muddy, wet weather and deep snows, the larger the fields may be to give uniform results.

The carrying capacity of an acre of corn of varying yields is approximately given in table XXIII.

TABLE XXIII.—CARRYING CAPACITY OF AN ACRE OF STANDING CORN
Average Weight at Beginning 125-150 Lbs.*

Bushels on the Acre	30 Days	60 Days	90 Days	120 Days
40	14-15	6- 7	4- 5	3
50	18-19	8- 9	5- 6	4
60	21-22	10-11	6- 7	4-5
70	26-27	12-13	7- 8	5-6

*The time required for heavier or lighter hogs to gather an acre of corn may be proportionately approximated from these average figures.

METHODS OF FENCING.

Practically all of the men who use temporary fencing depend upon 26, 28, 32 and 40 inch woven wire, 95% of those stating the size mention the 26-inch. A majority of these use the corn stalks as posts, tying the woven wire to them. A few use small handy stakes which may be driven with a sledge.

The fencing methods are best illustrated by a few quotations from over the state:

"Set end posts good and solid about 8 to 10 feet from the regular line fence.....run the brace wire to the bottom of a post in the permanent fence. If corn stalks are big and heavy tie fence entirely to them using binder twine on every fourth or fifth stalk. If stalks are inclined to be weak drive a few stakes with a sledge.....stretch tight.....and the hogs will not bother."

"We tie fence to corn stalks, but cut off the stalks just above the fence to keep hogs, especially if they are heavy, from knocking down the fence in their endeavors to get ears from stalk posts."

"We use short wood posts, fill wagon box, drive down near row, sledge the posts in from the end of the wagon, and then follow with woven wire.....two men can put in 120 rods in half a day."

"We cut off the two rows inside to keep the hogs from the fence and to facilitate rolling the wire, also cut off top of the row to which 26 inch fence is tied."

The essential things in putting in a temporary woven wire fence are:

1. Good, well-set corner-posts.
2. Use woven wire, preferably the handy 26-inch, and stretch it tight.
3. Tie or wire the woven fence to the corn stalks.
4. Drive light stakes where needed, especially if stalks are weak, and staple lightly.

Cutting the top off of the row to which the fence is tied is optional, but may be advisable. Cutting the two rows inside of the fence is not ordinarily necessary.

Hurdles were mentiond by only one man but he is now using woven wire; movable wooden hurdles are too bulky and cumbersome as well as too expensive to be handled advantageously in the cornfield.

Quite a large number use fields permanently fenced, in fact over 30% of those replying spoke of having well established, hog tight, permanent fences.

Many prefer long fields easily cross-fenced with minimum wire.

One method of overcoming the use of temporary fencing is to husk out, say half of a 30-acre field and turn the hogs in the remaining 15 acres; at this time the corn is hard and at the right stage of maturity to be "hogged-down." A number of Iowa men follow this practice.

MATURITY OF CORN WHEN HOGGED.

The question, "When do you turn into the corn?" solicited a various array of answers, summarized in table XXIV.

TABLE XXIV.—WHEN ARE HOGS TO BE TURNED INTO CORN?
178 Farmers Reporting

Stage of Maturity	Number Giving Time	Per Cent Following Each Practice
In milk	4	2.25
Denting	37	20.79
Dented	40	22.47
Well dented	51	28.65
Matured or ripe	46	25.84
	178*	100.00

WELL DENTED OR RIPENED CORN IS PREFERRED.

*Eight men (not included) mention turning their little pigs into corn late in July or early August to get them on clean ground, in a shady place, and incidenally clean up the weeds and exercise considerably with much good resulting to their growth.

But few men turn into the corn while it is still in the milk. A comparatively large number wait until it is well-dented or matured; 76.96% turn into corn from time it is dented until ripe. The dry matter in corn grain increases steadily up to maturity, justifying the farmer's practice.

To get the greatest amount of pork from an acre, wait until the corn is fairly well-dented rather than turn into when in the milk, or when just beginning to dent. To turn on during the milk stage is to sacrifice pork yield. To turn into the corn when it was well dented has always been the practice in the Iowa Station's experimental work.

SOME DISADVANTAGES IN "HOGGING DOWN" CORN.

A varied array of opinions was given in answer to these questions:

Are there any disadvantages in "hogging-down" corn?

Do the hogs waste any corn?

How do you find the field plows after "hogging-down," is it puddled in any way?

TABLE XXV.—SOME DISADVANTAGES OF "HOGGING-DOWN" CORN
Tabulated on Basis of 194 Men Replying

Objection	Number Reporting	Per Cent of the 194 Men Mentioning Each Disadvantage
None	70	36.08
1. Hardens land if pastured when wet	68	35.05
2. Some waste in wet weather	30	15.46
3. Loss of stover	27	13.92
4. Difficulty of fencing	13	6.70
5. Brood sows and gilts get too fat	6	3.09
6. Takes extra care to turn into new corn	5	2.58
7. Heavy hogs may waste some	4	2.06
8. Do not gain well after "Hogging-Down"	4	2.06
9. Liable to neglect the hogs	2	1.03
10. More liable to sickness	2	1.03
11. Stalks hard to plow under	2	1.03

*Some men mention a couple or more disadvantages all of which are classified.

Obviously there are some objections to the method of "hogging-down" corn; the question naturally arises, "Are these valid and if so can they be overcome?" What are the main disadvantages? Table XXV summarizes those given.

That 36% of 194 men giving experiences should report no objections or disadvantages to the system signifies that if there are any disadvantages they are minor ones in their estimation.

1. *Hardens land if pastured when wet.* Slightly over 35% mention this. This objection is by no means found on all farms, the answers to the difficulty of plowing question affirm. The summary of these answers is given in table XXVI.

TABLE XXVI.—DIFFICULTY IN PREPARING AFTER "HOGGING-DOWN"
173 Men Give Experience

	Number Reporting	Per Cent of Each Opinion
No difference*	105	60.69
Plows harder in spring if pastured when wet	68	39.31
	173	100.00

*It is entirely probable that many of these men who noted no difference in spring, kept hogs off when very wet; some speak of winter freezes loosening up the land.

That no difference was noted in the difficulty of plowing or the preparation of the seed bed was the experience of over three-fifths, or more than 60%, of the 173 men giving their experience on this point. Of the hardened fields some say: "Is a little cloddy, but makes little difference." "Plows fine if pulverized." "Plows hard but get double crop." "Frost neutralizes hardening."

Manifestly the character of soil will affect the results of hardening somewhat; the gumbos and clays tending to become hard, while the sandy soils suffer but little under the same treatment.

2. *Some waste in wet weather.* A little over 15% of all the men interviewed mention this objection. Table XXVII gives a systematic summary of the answers to the question; "Do the hogs waste any corn?"

TABLE XXVII.—WASTE OF CORN BY HOGS
182 Men Give Observations

Is Any Corn Wasted?	Number Reporting	Per Cent for Each Classification*
Not any	126	69.23
Only in wet weather	30	16.48
Very little, if any	28	15.38
Some	7**	3.85
Old hogs will, shotes do not	4	2.20

*Some answer under two heads.
**Usually qualified by such as these: "Not more than a bushel on the acre;" "When hogs get off feed;" "But not enough to pay for gathering," etc., etc.

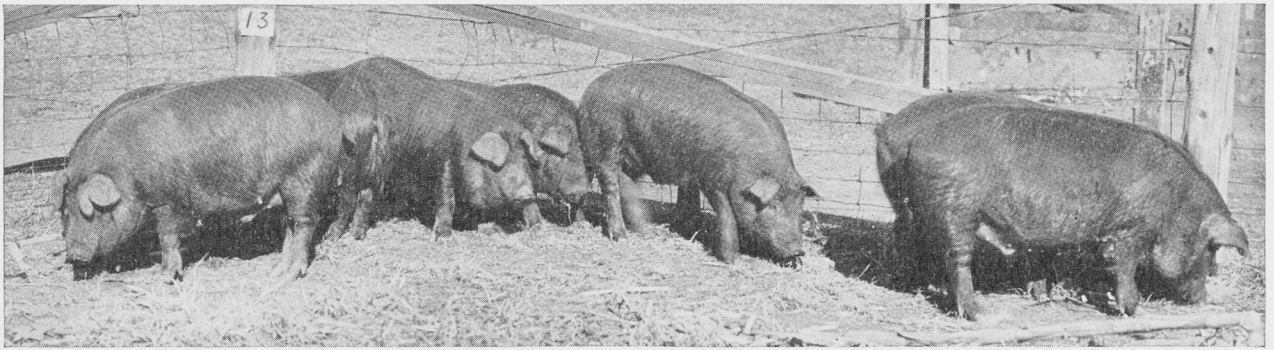

Fig. 4.—Hogging down shotes fairly well finished, now ready for economical dry lot feeding in December.

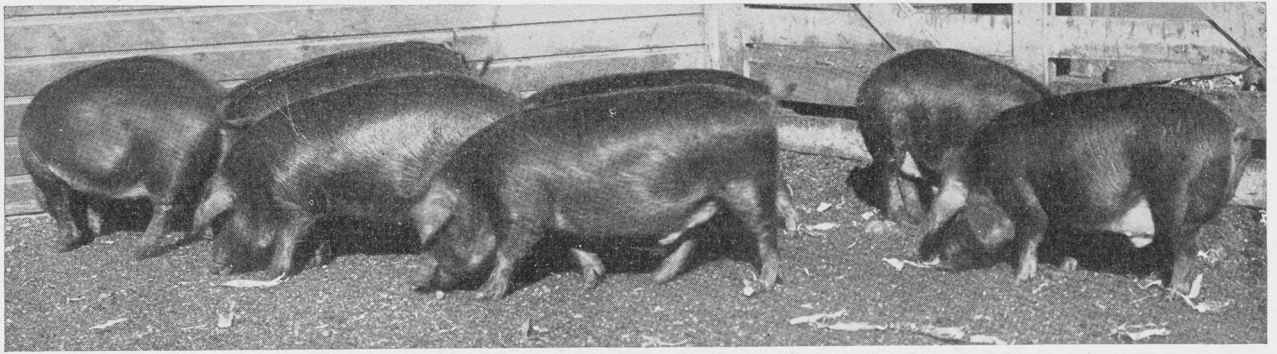

Fig. 5.—Corn field fed hogs finish quickly and evenly when corn is properly supplemented.

Over 69% mention no waste. A few mention "some," and others designate that the old hog is the chief offender.

Generally speaking there is very little if any waste during the dry weather, the gilts and young shotes can clean this up in good shape. Obviously the remedy is to keep off the land in extremely wet weather.

3. *Loss of stover.* Almost 14% mention this. The loss of stover from a cattle, horse or sheep feeding standpoint is inevitable in the "hogging-down" way. If the waste of stover is considered a serious matter then of course that must be taken into consideration in determining the profits. In practically all sections of Iowa, however, at the present time, the saving of corn stover has not been emphasized. Later when the practice of putting considerable corn in the silo and shocking the remainder increases, then this disadvantage will be more pronounced. That a high value is not placed upon corn stalks as they stand in the field at the present time in Iowa is quite generally recognized. One of the interviewed men puts it this way: "I lose the stover pasture but it amounts to little as I can buy all I want from 50 cents to $1.00 an acre."

4. *Difficulty of fencing.* Most assuredly hog tight fences are needed. The labor which is saved by the hog will more than offset the fencing difficulty. In addition, the efficient handling of the corn crop by the hog will counterbalance this disadvantage somewhat. Inasmuch as temporary fencing can be put in cheaply and quickly this disadvantage is not serious. A trial of the 26-inch woven wire tied-to-the-stalks-method has won many converts.

5. *Brood sows and gilts get too fat.* Only 3% mention this, the other 97% evidently put the brood sows and gilts out on pasture and limit the grain ration or else take them out of the cornfield before they become too fat. One man says, "I turn my gilts in because I want to have plenty of size at breeding time. I have considerable oats, allowing it in a self-feeder. My experience is that they make better breeding gilts if they do not become too fat, but I take them out before that occurs." Generally speaking of course the remedy is to keep the breeding sows out of the cornfield.

6. *Takes extra care to turn into new corn.* This is not a serious matter ordinarily; it always takes care in putting either hogs, sheep, cattle or horses on full feed.

7. *Heavy hogs may waste some.* The remedy is to clean up with young shotes or breeding hogs; to confine the old hogs more closely; to use but a few old hogs to a field with many shotes; or else not use the large hogs for this purpose.

TABLE XXVIII.—"HOGGING-DOWN" SHOTES DO WELL WHEN FULL FED AFTER COMING OUT OF THE CORNFIELD

Pasture vs. Cornfield Grown Hogs Finished in Dry Lot

Ration: Ear Corn Plus 8 to 10% Meat Meal

Source or Previous Ration and Treatment Just Before Dry Lot Feeding.	Year.	No. of Hogs.	No. of Days.	Initial Weight, Average.	Weight During Period, Average.	Daily Gain, Average	Feed Required for a Hundred Pounds Gain.		Cost of a Hundred Pounds Gain: Corn @ 50c. Meat Meal @ $2.50 cwt.
							Corn*	Meat Meal.	
Pasture with ear corn, oats and skim milk	1910	9	63	88.	136	1.620	385	41	$4.54
Standing field corn and Canadian field peas	1910	9	70	79.2	128	1.47**	362	39	4.21
Standing field corn and soy beans	1910	9	19	134.6	155	2.214	252	29	2.98
Standing sweet corn and soy beans	1909	9	28	114.0	138	1.754	319	37	3.77

*Corn grain on the cob.

**The last 34 days of the 70, or half of period, these hogs gained from 127 to 182 pounds, or an average daily gain of 1.61 pounds.

TABLE XXIX—CORNFIELD FED SHOTES MAKE RELATIVELY GOOD GAINS FOLLOWING STEERS

Source, Ration and Treatment Previous to Transference to Dry Lot	No. of hogs	Degree of fatness (estimated)	Initial weight average	Gain in 90 days after steer average per hog	Average daily gain
1910 RECORD—34 HOGS.					
Pasture, hand-fed corn and meat meal	10	Medium	151	53	.59
Standing corn and Canadian field peas	4	Quite fat or choice	161	51	.57
Standing corn and soy beans	5	Medium	161	81	.90
Standing corn and rape and pumpkins	8	Medium	157	86	.96
Standing corn and vetch	7	Quite thin or common	105	98	1.09
1911 RECORD—69 SHOTES.					
Pasture, hand-fed, corn	33	Medium	112	79	.88
Dry lot*, hand-fed, corn alone	10	Medium	107	83	.92
Dry lot*, hand-fed, corn plus 10% meat meal	7	Medium	121	82	.91
Standing corn and 10% meat meal	7	Good	109	83	.92
Standing corn and soy bean forage	5	Medium	93	85	.94
Standing corn, 10% meat meal and green rye	6	Good	123	94	1.04

*Dry lot checks against standing field corn; litter mates of standing field corn fed hogs.

8. *Do not gain well after "hogging-down."* That hogs after coming out of the cornfield do make good gains either when finished in dry lot* or following steers is quite evident from an inspection of tables XXVIII and XXIX.

If hogs are forced to subsist upon corn alone without any pasture, or forage, or concentrated supplement, then of course they will tend to develop slowly, become somewhat overfat, refined in frame and somewhat unthrifty generally. The remedy in this case is to balance the ration for them not only in the cornfield but in subsequent dry yard or pasture feeding. Well fattened hogs coming from cornfield must not be expected to make rapid gains.

9. *Likelihood of neglecting hogs.* Hogs when overlooked may possibly become wormy and sometimes lousy; however, the cornfield is a clean foraging ground. Inasmuch as it is not possible to produce efficiently any kind of live stock without constant supervision and oversight this objection is hardly valid. Hogs in the cornfield properly supplemented are particularly healthy and need somewhat less supervision generally.

10. *More liable to sickness.* Only two men mention this; on the other hand 36 men, although not asked especially in regard to health of the hogs, remarked that the hogs were not only healthier and thriftier but they developed sturdier frames and were in better condition in the cornfield than when they were elsewhere. Of course the cornfield has this advantage, it is especially free from worm infection and the like. The hogs are not so liable to contract disease when running on clean ground as when foraging around the barns and sheds.

11. *Stalks hard to plow under.* A thorough disking or two will remedy this. The litter is generally somewhat decomposed because of being on the ground all winter—which means a more readily absorbable form of fertility; such fields of stalks revert to manure and soil faster than the hand-husked.

12. *Minor disadavntages.* Some of the lesser objections mentioned against the "hogging-down" method is that hauling of water is a problem. Another man mentions rooting. It is particularly noticeable, however, with the man having rooting difficulties that no supplement was sown in the cornfield, no pasture was allowed, neither was any supplement bought and fed. Observations of this station have clearly shown that hogs that are well fed upon the necessary amount of protein and mineral nutrients are not nearly so liable to root as those which are not. When a hog turns up the corn-

*The Minnesota Station (Minn. Bul. 104) compared the gains of yard and cornfield fed hogs after corn was hogged; the subsequent gains were somewhat more rapid and made a little more economically on the hogs that had developed stamina and health out in the cornfield.

field from one end to the other it is a clear sign that he is not making his owner as much profit as he should. Another mentions that the snows come too quick sometimes. Still another says he cannot save the pumpkins. A couple referred to the little pigs overeating and becoming stunted in the cornfield. The remedy is not to use very young pigs for "hogging-down." With well dented corn, however, if some high protein supplement, such as rape, skim milk, tankage or meat meal is used, this disadvantage will not be so pronounced. The difficulty is largely one of too much fattening corn without sufficient growing protein and minerals. One man mentions milk weeds as being especially troublesome after the hogs have gathered the corn, his observation being that the seeds more easily lodge in the places rooted by the hogs and so on. These are all minor objections, the remedies of which are obvious. Let us look to the advantages.

SOME OF THE ADVANTAGES OF "HOGGING-DOWN" CORN.

1. *Labor is saved.* Four handlings of the corn crop are omitted, namely:

(a) Husking.
(b) Cribbing.
(c) Reloading, shoveling into wagon at a later feeding time.
(d) Feeding the hogs on pasture or at the yards.

These enumerated handlings of the corn crop are modified under local conditions; some simply take the load of corn from the field, if they have an extra wagon, into the hog lot and feed it out there, thus doing away with cribbing and reloading.

Two handlings of manure are discounted. The manure is dropped in the fields where it is needed, no labor is necessary to haul it out of the lots and to scatter it. Any animal such as the hog, or device such as the self-binder, the corn husker, or gang plow is welcome under the present existing labor conditions; "hogging-down" has been pressed into service largely because of the extenuating difficulties arising in the securing reliable efficient help to harvest the corn.

2. *Storage charges are saved* upon the portion of the corn hogged inasmuch as crib space is not needed. The rats and mice do not get any of the corn that is "hogged-down."

3. *Returns are equally as good* in pork produced where the hogs gather their feed themselves as where it is hand-fed. It is proposed of course that some pasture or supplement be fed in conjunction with the corn in field as well as in dry lot feeding. Hogs running in the cornfield and having alfalfa, rape or clover pasture in addition with possibly a little supple-

ment depending upon the pasture used are ideally handled to secure a maximum of pork at a minimum of expense. The hogs gain more economically and rapidly when in the cornfield properly supplemented than they do in dry lot.

4. *The hogs develop good constitutions* with considerable strength and are in excellent condition for quick fattening feed after coming out of the field. Range with its accompanying exercise provides a most excellent tonic; the hogs are healthier than in dry lot feeding and are especially inclined to stretch and develop in the cornfield, building frame and muscle to a large degree, putting them in good shape for a few weeks close-pen fattening.

5. *No manure is lost,* practically speaking, as in dry lot feeding; of course this does not apply to pasture. Animal husbandry has not yet been able to devise a system of manurial fertility conservation which would excel the "hogging-down" way. With the almost entire lack of leaching loss we have only that fertility removed from the land which is carried away in the hog's body; which really comprises only a small portion of the corn crop's fertility.

6. *The manure is evenly and uniformly distributed* over the field in such a maner as to do the most good without the intervention of human labor. Hogs easily excel the modern mechanical manure spreader. These manurial advantages of "hogging-down" mean increased yields as compared to the elevator way of handling the corn crop.

7. *The crop is harvested without waste,* the hogs if rightly managed picking up practically every stray kernel of corn.

By following up the fattening hogs with young shotes or even with brood sows the field will be garnered more closely than it would be by the ordinary husker. In truth the hogs turned into the field after the husking is over pick up considerable corn which might otherwise go to waste.

8. *The weeds may be cleaned up* to some extent. One man especially says, "Quack grass has disappeared permanently since I started 'hogging-down.'" One would not ordinarily expect such a happy result as this but nevertheless considerable of the weeds are destroyed.

9. *Hogs may follow up cattle* and otherwise save waste. They may clean up after silo filling time, gathering the ears which have been dropped by the corn binder, they may follow the husking machine and garner the waste grains.

10. *Facilitates and encourages the gathering of seed* corn early from the standing corn in field. One practical man puts it this way: "The reason many men do not gather their seed corn early is because they do not like to 'smash' down the rows with a wagon, and carrying a sack is tedious, discour-

aging, sticky business. . . With us in half a day two men with team and wagon gather enough seed to plant a hundred acres. . . We then turn the hogs in and they efficiently do the rest with much profit resulting directly and indirectly."

11. *Poor stands of corn may be taken advantage of* in that rape may be sown at the last cultivation, thus enabling the land to produce a full crop that season; the hogs do the rest.

12. *Brood sows which are to farrow spring litters may be advantageously run into the field* after the fattening or other hogs are removed; they gain health from so doing, thriving under the tonic of invigorating exercise and beneficial range.

13. *Fall plowing is sometimes possible* if the hogs clean up the field early, thus preventing rush of spring work.

14. *Organic plant matter will be largely added* to the land if supplementary crops such as rape, rye, soy beans and peas or the like are sown in the cornfield. The rape stumps as well as the mat of material left from rye or soy beans will discourage washing and erosion to some extent. The "hogged-down" stover reverts more quickly to the desirable manurial and fertilizing form of organic matter than does the hand-husked. Quick and speedy incorporation of crop residues into the soil is quite desirable.

15. *Corn is harvested more quickly.*

GENERAL CONSIDERATIONS.

I. The Variety of Corn to Use.

The highest yielding corn which is adapted to the locality is the kind to use. One would do well to have a small field of an early variety of corn, possibly, on which to turn hogs the first thing in the fall, and thus lengthen the "hogging-down" season.

Sweet corn is a favorite with many because it furnishes pasture which is ready from August 1 on, depending upon variety, season and so on. Thin sows which have weaned their pigs and are ready to be fattened will do exceptionally well in a field of sweet corn, they eating the entire stalk and all at the beginning.

Sweet corn has the advantage in being green and ready when the blue grass is hard and dry. Furthermore at this time of year the supply of corn in the crib usually runs low, thus it is a friend in need.

Rape and other crop supplements make better growth in the sweet corn than they do in field corn ordinarily because of less shade and more optimum moisture conditions early in the season.

The serious disadvantage to sweet corn is that it will not produce as much pork per acre as will field corn because it does not yield so well—but taking into consideration earliness of maturity and green feed presence during the period of dry and hard blue grass and probable scarcity of grain feeds it may be advisable to use it.

II. Preparing the Hogs Before Turning Into the Cornfield.

It is quite essential that the hogs be not turned into the cornfield without being previously put upon a full feed of corn. It is wise, conservative practice to feed green fodder cut from the field in conjunction with old corn gradually accustoming the hogs to their new ration. Some men feed oats at this time, one especially mentioning the placing of oats in a self-feeder in the cornfield for a week or so after turning in. Oats will help somewhat in counteracting the laxative effects of the green corn. If the hogs come out of the cornfield at night up around the barn it is well to give them a feed of old corn in the morning early in the season before turning out to the field again. One man says, "We do not turn hogs in the first month until afternoon, having them well fed up at this time. Every night they are called up and fed in the following forenoon before turning out." Another says, "Start out upon sweet corn about the first of August and it is an easy matter then to turn out into the regular cornfield." Haste and lack of precaution may make for waste of resources. Prepare the hogs rightly for the "hogging-down" process and avoid possible misfortune.

III. Water and Shade.

Hogs do better when an abundance of water and shade is provided. Good, clear, tile-water is especially good if the land from which it comes is free from cholera or other contagious infection. Clear creeks that originate on the farm, or fresh springs, are also most excellent places for hogs to drink. The ordinary barrel waterer works well under most conditions. One cannot afford to turn hogs into the cornfield to forage their living unless he gives them an abundance of water; the fattening hog has need for considerable water, much more than the stocker hog, and to secure efficient returns from feed eaten, water must be furnished pure and fresh in abundance.

TABLE XXX.—COMPOSITION OF CORN, AND SOME OF ITS SUPPLEMENTS

(Pounds in a Hundred)

All Analyses from the Laboratory of Chemical Section*e*

FIELD OR FEEDING SAMPLE.

	Dry Matter	Water	Protein (N x 6.25)	Carbohydrates (N. F. Extract)	Carbohydrates (Fiber Extract)	Fat (Ether Extract)	Carbohydrate, Equivalent. (Carbohydrates 2.2 times fat.)	Ash	Pounds of Carbohydrate. Equivalent to a Pound of Protein.
Corn, 1910	85.22	14.78	8.82	68.87	2.04	4.06	79.84	1.43	See
Corn, 1911	87.27	12.73	10.00	69.78	2.01	4.03	80.66	1.45	below
Meat meal, *a* 1910	92.40	7.60	61.52	1.54	4.83	10.13	46.60	14.38	
Meat meal, *a* 1911	93.35	6.65	59.67	1.83	6.70	10.00	30.53	15.15	
Rape—whole plant, 1912	7.39	92.61	1.96	3.15	.84	.21	4.45	1.21	
Rape—edible *b* portion, 1912	15.36	84.64	5.62	6.28	.89	.72	8.75	1.86	
Rye, green—edible portion, 1911	18.14	81.86	4.51	7.52	2.93	1.00	2.18	8.73	
Alfalfa—edible portion, 1911	24.25	75.75	7.44	11.28	2.34	.52	14.76	2.67	
Blue grass—whole plant, 1911, green	47.51	52.49	5.25	20.42	15.19	1.35	38.58	5.29	
Soy beans, edible *c* portion, 1911 green	25.22	74.78	5.87	12.39	3.77	.46	17.17	2.72	

DRY MATTER (WATER FREE) MATERIAL.

Corn, 1910	100.00	None	10.35	80.81	2.39	4.76	93.67	1.68	9.05
Corn, 1911	100.00	None	11.46	79.96	2.30	4.62	92.42	1.66	8.07
Meat meal, 1910	100.00	None	66.58	1.67	5.23	10.96	50.42	15.56	.47
Meat meal, 1911	100.00	None	63.92	1.96	7.18	10.71	32.70	16.23	.51
Rape, whole plant, 1912	100.00	None	26.54	42.56	11.34	2.86	60.19	16.73	2.27
Rape, edible portion, 1912	100.00	None	36.59	40.89	5.77	4.67	56.93	12.07	1.56
Rye, green, edible *d* portion, 1911	100.00	None	24.85	41.44	16.17	5.50	48.14	12.03	2.81
Alfalfa, edible portion, 1911	100.00	None	30.69	46.51	9.63	2.14	60.85	11.03	1.98
Blue grass, whole plant, 1911, green	100.00	None	11.06	42.98	31.98	2.84	81.21	11.14	7.34
Soy beans, edible portion, 1911, green	100.00	None	23.29	49.13	14.95	1.84	68.13	10.78	2.93

a Armours fed to check dry lots in "hogging-down" experiments in 1911.

b Edible portion represents that part which the hogs eat readily.

c Taken from corn and soy bean plot on Oct. 12, 1911. Represents upper and side leaves, pods and some of tender stem. Hogs were closely watched and sample taken as they gathered it.

d Sample taken October 14, 1911, from corn and rye plot. Tenderer portions as eaten by hogs collected.

e Dr. A. W. Dox, W. G. Gaessler and S. C. Guernsey.